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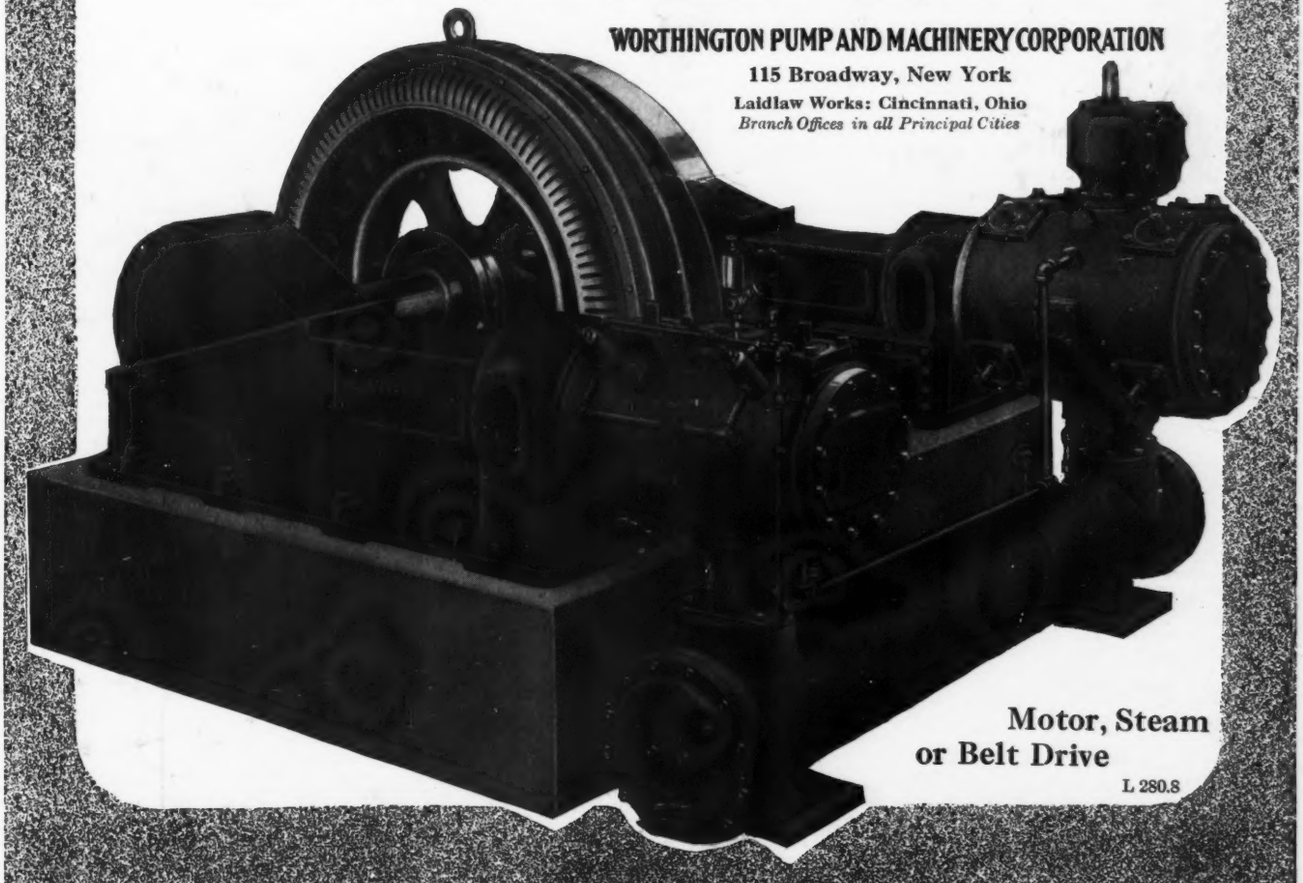

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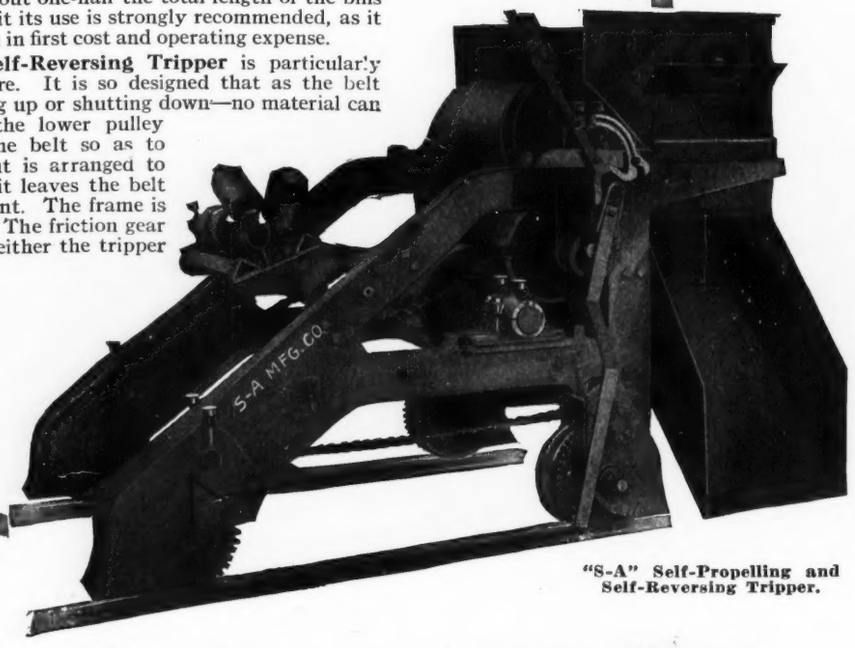

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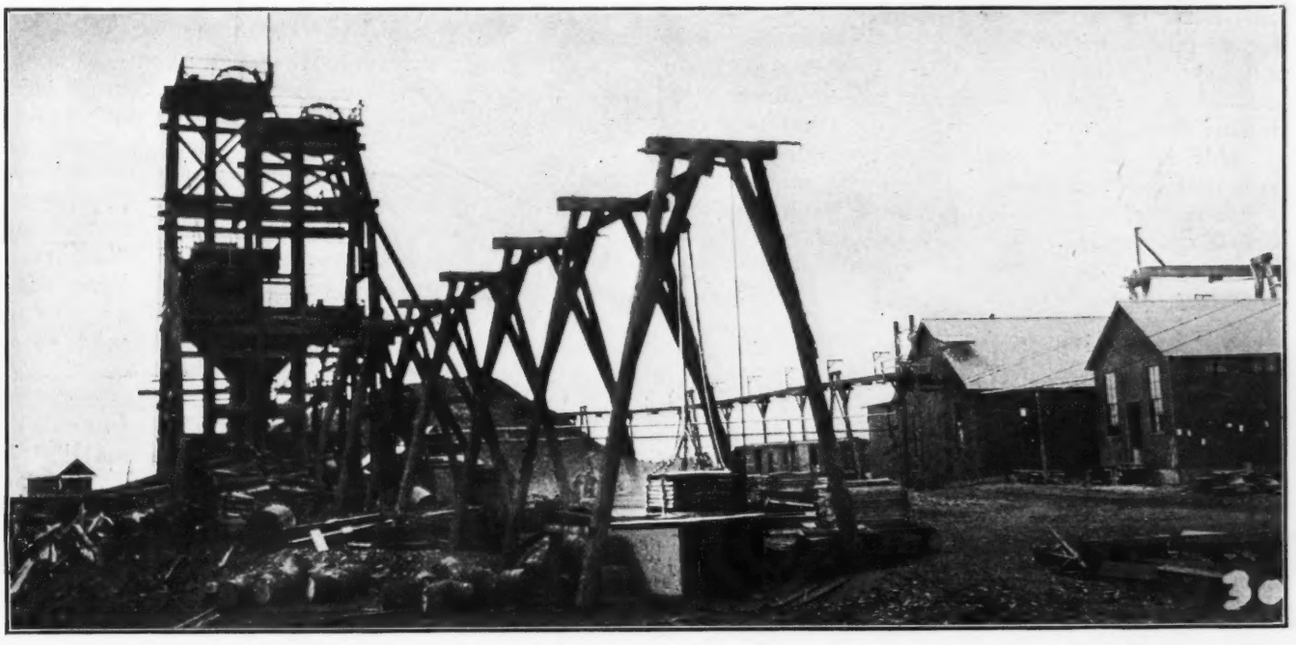
Economic Importance of Wood Preservation

By KURT C. BARTH*

Experimentation and practice have proved that proper seasoning and preservative treatment of timber increase its life and usefulness. The author discusses the various steps leading to the successful application of wood preservation.

THE practice of wood preservation in the mining industry is not only desirable economy, but a requisite to the proper utilization of structural wood, which for many years has been the most popular material used in mine structures, due to its availability, lower cost, and ease of employment. These factors are now important, since the demand for finished-steel products has increased inordinately, and skilled labor is not always available. The average increase in prices of 22 metals since 1914 is said to be 124%, as compared with an increase during the same period of 20 to 30% in the prices of lumber products.[1] Furthermore the national need for steel products for war purposes compels the use of wood and the conservation of steel, wherever possible, as a patriotic duty. These circumstances combine to create conditions under which the practice of wood preservation is not only of greater material advantage than heretofore, but an actual necessity in many cases. Structural steel latterly has been widely used in mine structures because of its permanent character, while the decay of mine timbers, both above and below the ground, makes necessary continual replacements and repairs, although this can be obviated to a marked degree by the proper preservative treatment. It is obvious that in order to protect wood from decay and insects it must be neutralized, or chemically treated, so that the development of destructive agencies is arrested and made impossible. Therefore, paint, although it naturally gives a certain amount of protection to wood, not being a toxic agent, is not a preservative for the purposes under discussion.



A WOOD-PRESERVATION TREATMENT PLANT AT A MINE. SHAFT LAGGING BEING TREATED BY THE OPEN-TANK PROCESS

The average life of untreated surface timber structures must be placed at from 10 to 15 years to provide a conservative basis for figuring depreciation. Wood used underground is destroyed by decay in a much shorter period, the average natural life being from four to six years. This period does not take into consideration timber the usefulness of which is, previous

*The Barrett Co., Chicago, Ill.

[1]L. C. Boyle in the "Lumber World Review," Sept. 25, 1917.

to the expiration of its natural life, destroyed by mechanical abrasion. Wooden surface structures, shaft timber and "lath," sawed timbers used underground in permanent sets and for other purposes, are frequently destroyed by decay rather than by wear, so that preservative treatment of the timber is not only advisable but necessary. In mine shafts that have been lined with concrete and steel and in which timber has been used for cross-ties, longitudinal ties, or cushions, etc., the replacement of the timber involves considerable expense and interruption of traffic and preservative treatment is an important factor in prolonging the life of this material.

In general, underground timber and structural wood used in surface structures are classified alike, and the question as to whether creosoting is advisable may be decided by the following rule: Timber that is permanent in character; that is, which is not exposed to destruction by mechanical wear before the expiration of its natural life, or the usefulness of which does not cease before the advantages of preservative treatment can be realized should be creosoted.

Among surface structures may be classed tipples, elevators, trestles, shafthouses, headframes, tramways, ore bins, coal docks, coal bunkers, chutes, etc. Where wood or semi-wood mine cars and skips are used the parts not likely to be destroyed by wear may also be treated to advantage. Another field in which the opportunities for the use of creosoted wood are numerous is that of miscellaneous equipment used in concentrating mills, stamp mills, smelteries, etc., which are usually included in the plants of zinc and copper mines. Continuous replacements and repairs are necessary, and probably 90% of the wood requiring replacement has been destroyed by decay. The period of service of concentrating tables, launders, jigs, flotation machines, sand boxes, wooden screens, tanks, foundation timbers, floor planking, etc., could be doubled by the use of creosote.

Methods of Wood Treatment

The method of preservation most available to mines at considerable distances from commercial creosoting plants is the nonpressure process, known as the open-tank system, which consists of hot and cold treatment of wood in refined coal-tar creosote oil, or the brush method of applying two or three coats of refined coal-tar creosote oil to points of contact and exposed surfaces. Creosoting is advisable under conditions where the mechanical abrasion is slight or entirely absent and a heavy impregnation of the wood, is, therefore, not required. The open-tank system is sufficient to preserve structural timbers and lumber used for miscellaneous purposes.

The brush method should be used when a temporary increase in life is sought; that is, when an average increase in durability of five years is sufficient, and when the open-tank system of treatment is not practicable. To obtain the best results the oil should be heated to a temperature of 150° F. However, a properly refined coal-tar creosote oil is liquid at what would be considered normally a low working temperature, which permits its use without heating during seasons of the year when climatic conditions are favorable to outside construction work. The open-tank process consists of alternate hot and cold applications of refined coal-tar creosote oil by immersion and continuous soaking in open tanks without artificial pressure. This requires no mechanical apparatus other than tanks, hoists (in some cases) and means of heating the oil.

The procedure in the open-tank process is as follows: After the lumber to be creosoted has been framed, bored and cut to size it is given the hot treatment, which consists of immersion in a bath of oil having a temperature of between 150° and 200° F., and this is continued for varying periods, depending upon the species of wood and the size of the timber. Immediately afterward the timber is immersed in a cold bath of refined coal-tar creosote oil, which is kept at a temperature not in excess of 100° F. for periods equal in duration to the hot bath. The theory of the open-tank process is that in the hot treatment the heat of the preservative expands and expels a portion of the air and water contained in the wood cells. Upon immersion in the cold bath, or when subjected to a change in temperature caused by the cooling of the creosote, there is a partial contraction and condensation of the air and water that remains, which results in a slight vacuum within the wood. This vacuum is aided by atmospheric pressure, combined with capillary attraction between the wood cells and the preservative, which achieves the actual impregnation.

Advantage of the Open-Tank System

Modifications conforming to special requirements and local operating conditions are inevitable on all large jobs, and may be made without affecting the efficiency of the treatment, and this is one of the most important advantages of the open-tank system. Lumber of small cross-section often can be effectively treated by immersion for short periods in the hot bath alone, especially when of a species not particularly resistant to impregnation. Heavy timbers are most economically treated by continuous immersion in one tank during the entire process. Upon expiration of the hot treatment the timbers are not removed to a cold tank, but the steam is shut off and the bath allowed to cool. If an open fire is used to heat the oil it is quenched and both the oil and the wood are permitted to cool to about 100° F. If loblolly pine timbers or any species that readily absorbs creosote is to be treated, the cold-tank bath may sometimes be dispensed with.

The dipping method is a modification of the open-tank system and is used when lumber of small cross-section and of a species easily impregnated is to be treated. It becomes a modification of the brush method, also, when timbers of a large cross-section are to be given a short immersion in order to eliminate the double handling required by the brush method. The oil should be maintained at a temperature of 150° Fahrenheit.

Immersion Period Varies with Hardness of Wood

In general the period of immersion in the preservative should be as follows: Close-grained woods naturally resistant to impregnation, one hour in the hot and one hour in the cooling bath for each inch of the largest cross-section. Species more easily impregnated require a quarter of an hour for each inch of the largest cross-section, and dimension lumber should remain from

10 to 30 min. in each bath, although in many cases the dipping method is sufficient for boards.

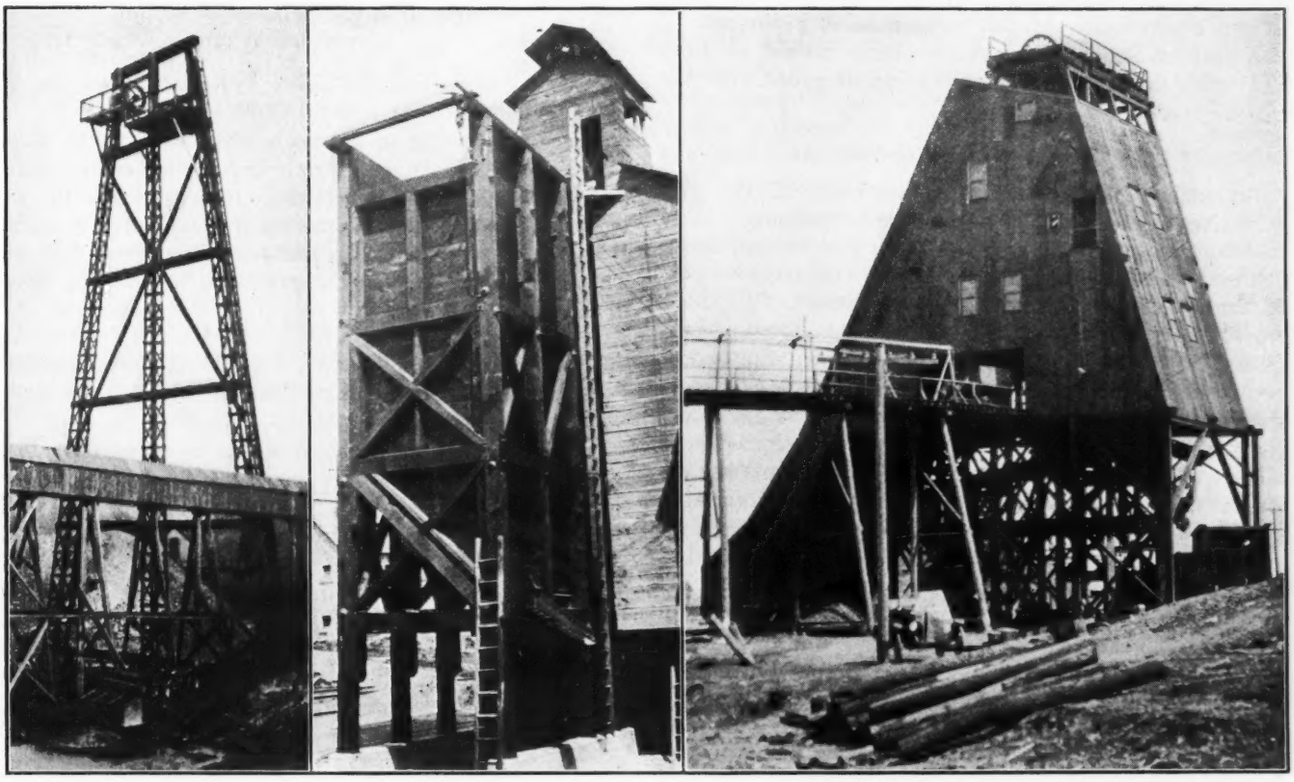
The proper preparation of wood is probably more important than the treatment itself, the effectiveness of the latter depending largely upon whether or not the timber has been satisfactorily seasoned. It is difficult to obtain satisfactory results by nonpressure methods in the treatment of green timber with the exception of sap and loblolly pine. If the wood cells are filled with moisture the creosote cannot penetrate unless the water is first expelled by artificial means. This is accomplished either by steaming, as in the pressure processes, or by continuous soaking in the hot bath until the wood has been heated throughout to the temperature of the oil, which must be between 200° F. and 220° F. The former process is not often available, as mines seldom have the necessary apparatus for creosoting by pressure, which requires more time than it is practicable to devote to the work. It is therefore self-evident that wood which is to be treated must be seasoned until air-dry.

Numerous cases have been observed where the attempt to treat practically green timber by short immersions in hot creosote oil resulted in failures for which the preservative was held responsible, or that were used as a basis for charging nonpressure methods of treatment with inefficiency, whereas the real trouble may be attributed to negligence or ignorance.

With few exceptions, such as a breakdown, etc., it is usually possible to purchase timber requirements sufficiently in advance to permit of proper seasoning; that is, seasoning for about six months previous to treatment. Seasoned lumber is more expensive than green wood or timbers direct from the saw, but the increased charge made for wood properly conditioned, or the interest on the investment resulting from storage of timbers for three to six months to allow proper seasoning, is more than offset by the increased value of the dry timbers and by the greater efficiency of the preservative treatment. If it is considered a burden to carry such extra charges in any other manner, they may be added to the cost of creosoting without materially decreasing the profit derived from the proper practice of wood preservation.

Wood Preservation at Mines

Although a number of copper and iron mines have to some extent adopted the practice of wood preservation they could widen their activities in this direction with profit. Some iron mines are creosoting large quantities of timber and lumber for surface structures, such as headframes, shaft houses, trestles, coaling plants, and material for shaft timbers, and "lath," and certain copper mines have creosoted surface structures such as wooden pulley stands, ore bins, trestles, coal bunkers, cross-country launders, etc., and also concentrating tables, launders, sand boxes, tank screens, tanks, flooring, etc., in concentrating mills, stamp mills and leaching plants. One mine, in particular, recently built over 100 concentrating tables, the lumber for which was creosoted by the open-tank system previous to assembling.



Creosoted idler-pulley stands Creosoted ore bins at copper mine Shaft house constructed from creosoted timber

EXAMPLES OF MINE STRUCTURES IN WHICH TREATED WOOD HAS BEEN USED

The zinc and lead fields offer many opportunities for the practice of wood preservation. A recent inspection showed that wood was used almost exclusively for surface structures and equipment for mills. Rock and ore hoppers, exterior and interior launders, jigs, sludge tables and catch boxes, elevator shafts, floor planking,

foundation timbers, beams and girders, etc., are exposed to more or less severe conditions and require continual repairs and early replacement due to decay. Practically all of the timber used in this construction should be properly creosoted before erection. In addition to prolonging the life of the lumber, creosoting will eliminate the necessity of painting, thereby saving nearly enough to cover the entire cost of preservative treatment.

Underground conditions in zinc mines do not warrant the use of creosoted timber, excepting in special cases where the period of usefulness of the timbers is greater than their natural life. Operations in the zinc and lead fields often require removal of the entire plant, and it would seem under such conditions that it might not be economical to creosote the various materials referred to. However, in erecting them in a new location permanency is a desirable factor, and if the life of the lumber used in the construction of this apparatus is prolonged by chemical treatment the salvage value would be high and would leave a handsome margin of profit over the cost of creosoting.

Proper Preservation Essential

An important feature is the selection of the pre servative to be used in nonpressure treatments. Pure coal-tar creosote oil, which conforms to standard specifications and is refined to meet the special requirements of nonpressure treatments, is most efficient. Wood-tar creosote or adulterated coal-tar products are not permitted by any standard specification in the wood-preserving industry today. In the case of surface structures the preservative must be effective for many years and it is necessary that the product selected have a clear record as to its efficiency. Experiments are no longer necessary and success from proper treatment with the right preservative is assured.

Refined creosote oil may also be used as a paint. Not only is it more economical than the cheapest of oil paints but it lasts longer on account of its hue and non-volatile nature. After application the color is an attractive dark brown.

Other building materials than wood are treated in accordance with the respective specifications or directions furnished, because it is fully realized that unless care is taken in their utilization a monetary loss and sometimes disaster may follow. Structural steel is given frequent attention to prevent deterioration, and it seems unreasonable that when structural wood is used an effort is rarely made to protect it against destructive influence. An ounce of prevention is worth a pound of cure. Creosoted timber is most economical for general building purposes, and is practically permanent.

Mining in the Joplin District

An article appearing in the *Journal* of Oct. 6, on p. 596, under the title "Mining Practice in the Joplin District," in referring to blasting methods, states that "the rounds are loaded with charges varying from 25 to 150 lb.," giving the impression that this charge constitutes the entire amount of powder placed in the round of holes. The statement should read "the holes are loaded," for the holes are chambered before final loading, and sometimes as much as three boxes of powder placed in each hole.

Chromium, Its Occurrence and Mining*

Metallic chromium is not known to occur in the native state, but as prepared artificially it is a light green, glistening, crystalline powder, showing tin-white crystals under the microscope. It has a specific gravity of 6.8. The fusion point is above 2000° C. and the fused metal is as hard and tough as corundum. It is non-magnetic; when ignited in the air or hydrogen is slowly oxidized, but in the oxyhydrogen flame burns brightly, emitting sparks.

Pure chromium was first obtained by Moissan in 1894, by reducing chromic oxide with carbon in the electric furnace. It is now more readily prepared by the aluminothermic process, which consists in reducing chromium oxide with aluminum powder. The chromium thus made is passive, that is, it is not attacked by hydrochloric, sulphuric or nitric acids. Chromium prepared in any other manner is very active and evolves hydrogen even in the cold with these acids.

Chromite, the Only Important Mineral

Chromite, having the formula $FeO.\ Cr_2O_3$, with 32% FeO and 68% Cr_2O_3, is the only chromium-bearing mineral of commercial importance. It crystallizes in the isometric system, but the octahedral crystals are rare. It lacks cleavage, is brittle, and has an uneven fracture. The hardness is 5.5, specific gravity 4.32-4.57, the color brownish black to gray or yellowish, the luster metallic to submetallic, dull or greasy, the streak, brown to grayish brown. It is opaque, feebly magnetic, and infusible before the blowpipe. Several investigators have prepared it artificially.

The common form of occurrence is as rounded grains, or more often massive granular masses, which resemble magnetite and have sometimes been confused with it, but differ from it in being at most feebly magnetic. It is a most resistant mineral to weathering. Varieties of chromite with little chromium (under 10%) are really to be classed as picotite or chrome spinel, $(Mg\ Fe)\ O.\ (Al\ Cr)_2\ O_3$. They are of no commercial value.

Other chromium minerals are of scientific rather than commercial interest. Among the best known is crocoite, the lead chromate. Associated with it in the Ural Mountains is the mineral vauquelinite, a phosphate of lead, copper and chromium. The silicates include chromiferous garnet (ouvarovite), mica (fuchsite), diopside and tourmaline, while clay-like silicates, having chromium as an essential constituent, are avolite, milosin, and alexandrolite. Knoxvilleite and redingtonite are sulphates; dietzeite is an iodate and chromate of lime from the Chilean nitrate beds. The only sulphide, daubrélite, is found in meteoric irons, and contains both iron and chromium.

Geologic Association of Chromite

Chromite is by no means an important element of the earth's crust, the average given by F. W. Clarke being .033%. It is almost entirely restricted to basic igneous rocks like peridotite, dunite, pyroxenite, or their derived serpentine. In these the percentage of chromium may range from 0.05 to 0.5. Chromium shows indeed a curious isolation, being rarely associated with other metallic minerals, except possibly magnetite and

*Excerpt from an article by Heinrich Ries in "Mineral Foote-Notes."

nickel minerals. Although it occurs usually in basic igneous rocks, it is sometimes found in titaniferous iron ores to the extent of several per cent.

Unlike many other ores which may show a varied mode of occurrence, or a variety of associated minerals, that of chromium is comparatively simple. Chromite, is found in commercial quantities either in basic igneous rocks, including their derived serpentine, in unconsolidated materials such as residual clay, or in stream materials obtained from these rocks by rain and stream action. The first may be referred to as magmatic segregations, the last two as residual deposits and placers. When occurring in basic igneous rocks chromite is found as disseminated grains, masses, or stringers. It is commonly regarded as a primary constituent of the igneous mass, and supposedly one of the first minerals to crystallize, in which case the masses represent segregations of chromite that occurred during the cooling and consolidation of the magma. Some believe, however, that much chromite may represent a late crystallization that was associated with the presence of mineralizers, and that it may not only have crystallized out between the earlier silicates, but in part replaced them.

ANALYSES OF SOME CHROMITE ORES

	Turkey	New Caledonia	California	Cuba
Cr_2O_3	51.7	55.7	52.68	50.00
FeO	14.2	13.2	15.30	18.57
Al_2O_3	14.1	16.2	11.40	12.44
MgO	14.3	9.8	16.23	13.38
SiO_2	3.5	0.2	3.40	3.82
CaO	1.7	0.25	.....	2.16
H_2O	0.5	1.05	0.94	....
MnO	....	0.2	0.15	....
P_2O_5	....	0.05	.....	0.45
S	....	....	.....	0.69

Mining of Chromite Stimulated by the War

In the Thetford, Que., chromite area, where the ore mineral is found not only as disseminated grains in both peridotite and pyroxenite, but also in large masses usually in the transition rock between these two, it is thought that the grains may represent earlier crystallization products, and the masses later ones. This district has shown a greatly increased output since the beginning of the war. Chromite is now being actively mined also at St. Cyr, Que.

The California deposits, in which production rose from a few hundred tons in 1914 to over 40,000 tons in 1916, due to the war, are likewise associated with basic igneous rocks and their derived serpentine. In that state there are two main productive belts, one in the Klamath Mountains and Coast Range from Siskiyou County to San Luis Obispo County, the other in the Sierra Nevada from Plumas to Tulare Counties. The former has large orebodies and better rail transportation. Small amounts of ore have also been supplied by Oregon and Wyoming, the production of the former in 1916 having been about 3000 tons. Most of the Oregon ore, like that of California, averages 40% Cr_2O_3, and this is the basis of sale.

Development of Western Deposits

Lack of transportation has greatly interfered with the development of the Western deposits, and California will furnish the chief domestic supply for some time to come. The success of the Pacific Coast ores also depends on the possibilities of concentration. This is especially important for the ores of eastern Oregon, and Inyo County, Calif., which lie east of the Pacific mountain belt, and for Glen Rock, Wyo. deposits.

Important chromite orebodies are also found in Rhodesia, in both serpentine and talc. The Turkish deposits, which have contributed large amounts to the United States, also lie in serpentine. Other chromite deposits occur in New Caledonia, New South Wales, New Zealand, Newfoundland, Cuba and Alaska. The accompanying analyses give the composition of ore from several localities.

Occurrences in Residual Clays

In the weathering of basic igneous rocks and the derived serpentine, a residual clay may form, through which are scattered grains, lumps and masses of chromite. Owing to the washing away of the clay a surface concentration of chromite may occur that is misleading regarding the richness of the ore in the unweathered rock below. It is possible that some of the chromite found in weathered deposits may be secondary, but no silicates of chromium appear to be formed, as is the case with nickel under similar conditions. In New Caledonia much chromite is found in residual clay, as well as in serpentine, and one mine, Tiebaghi, is among the world's largest producers of this ore. This district is, however, better known for its nickel ore.

Residual clays containing chromite exist near Baltimore and the ore was obtained by washing. The sand, washed as much as five times, sometimes ran as high as 55% Cr_2O_3 when concentrated. This region is of historic interest, because it was the cradle of the chrome industry in America, beginning in 1827, though at that time the chromite was extracted from the serpentine rock. In fact, from 1828 to at least 1850, Baltimore supplied most of the chrome ore consumed by the world. Here also was begun the manufacture of chrome yellow in 1828. It was the development of the larger and richer Turkish deposits in 1860 that is said to have stopped the export trade from Baltimore.

Chromite Placer Deposits

Placer deposits are found in those areas where the more resistant products of weathering have been concentrated in stream channels, and where these drain areas of serpentine or basic igneous rocks. Thus along the Pacific Coast the black sands, which carry gold and platinum, may contain considerable chromite, so that on treating the tailings derived from washing the sand, in a magnetic separator, a chromite concentrate is obtained. A concentration plant of this sort has recently been established at Kerby, Ore.

The mining of chromite is somewhat uncertain on account of the pockety nature of the deposits, which do not show any regularity of occurrence. There may be one or many lenses of chromite scattered through the country rock. Thus in the famous Rhodesia deposits, more than 100 lenses, some of them over 400 ft. in length, have been found. Either underground mining or quarry working is followed, depending on the shape and size of the deposit, as well as its proximity to the surface.

Chromite after mining may require only hand picking to yield a product rich enough to send to the smelters or manufacturers. If not sufficiently high grade it is crushed and concentrated mechanically. In Canada, milling ore containing as low as 10% chromic oxide can be successfully treated.

Metallic chromium has no direct use, but raw chro-

mite and chromium salts have a variety of applications. Owing to its great heat-resisting qualities, chromite is used as a basic refractory lining for furnaces, being made up either into bricks, or the ore lumps being packed in tight to make the furnace lining. Chromite stands changes of temperature well and also resists the attack of molten metals. For refractories, ore with 38-45% chromic oxide can be used. The most important use of chromite, however, is for the manufacture of the alloy ferrochrome or ferrochromium, which has been known since 1820.

Some idea of the importance of foreign sources of supply to the United States may be gained from the fact that the imports in 1916 amounted to 114,655 long tons. Of this Rhodesia supplied about 62,000 long tons, and New Caledonia about 34,000 long tons. The United States production rose from 244 long tons in 1913 to more than 47,000 long tons in 1916. California 40% Cr_2O_3 ore, in 1916, brought from $28.86 to $34.96 per ton at the eastern seaboard.

New Manganese District in Virginia

SPECIAL CORRESPONDENCE

The discovery of high-grade manganese ore is the cause of a mining boom in the region about Bluefield, W. Va. The deposits are situated in the adjacent section of Virginia of which Bluefield is the business and railroad center, and just now the scene of lively speculation in ore lands and prospects as well as of other activities commonly to be observed in a new mineral district. The boom has its basis in the good fortune of a prospector who located some of the more productive deposits and who in the last few months has shipped about 3000 tons of ore worth about $50 a ton, all of it taken from surface workings at little more expense than for shoveling and hauling to the railroad. Two or three additional discoveries of good ore have since been made, and the district probably will ship over 5000 tons during the current year.

The deposits are peculiar in that they occur high up on the summit ridges of the Appalachians at an average elevation of around 3000 ft., instead of in the valleys where most of the manganese is usually found in this part of the country. They have the further characteristic that they are associated with sandstone, although undoubtedly derived from the weathering of overlying beds of a cherty limestone that has now disappeared except near the base of the ridges, where uneroded remnants may be seen in places. Evidence of the former presence of the limestone on top of the deposits is to be had in the inclusions of chert within the ore. Their occurrence is usually indicated by abundant float on the surface, ranging from the size of walnuts to blocks weighing several hundred pounds. As much as 50 tons of ore has been picked from the ground above one of the bodies, which extend downward into the lateritic decomposition products of the limestone and for some distance as well into the sandstone. It is probable that the deposits will be found to be quite shallow, a few tens of feet deep at most, since at such high elevations erosion has been almost as rapid as weathering.

There is not sufficient evidence as yet to define the bounds of the productive area. The deposits seem to be distributed rather sparsely, and there is a chance that additional ones will be brought to light in the outlying areas on the line of strike of the present known bodies, that is to the northeast and southwest, where the same geological conditions may be expected to occur. The region has been little explored and was hitherto considered as of little interest in a mineral way, although it is close to the great coal and oil fields of West Virginia. The large-scale map of the Virginia Geological Survey provides the only comprehensive basis for study of the geological features. The Tazewell Folio of the U. S. Geological Survey covers the area just beyond the southwestern end of the district. So far it has been established that the ore-bearing area includes several lines of ridges in Bland and Giles counties, southwest of New River, W. Va., forming a belt 25 or 30 miles long and six to eight miles wide. The district is traversed for nearly its whole length by the New River, Holston & Western R.R., which has recently been extended to Suiter, Va., a small mountain town 10 miles in an air line due south of Bluefield. The ore is shipped mainly from Suiter and First Ford and is transferred to the Norfolk & Western at Narrows, on New River.

Land prices in the district have advanced in a way which is wholly out of relation to the actual values for mining or for any other purpose. It is not unlikely that this will retard the development of the deposits, many of which could be worked profitably only under the present extraordinary conditions of the ore market. The richness of the bodies, which admits of shipping much of the product without expense of washing, is a decided advantage; on the other hand there is likely to be little permanency to individual deposits, and their situation involves high costs of haulage, ranging at present up to $9 or $10 a ton.

The ores for the most part are firm, fairly compact admixtures of massive and botryoidal psilomelane with coatings and interlacings of crystalline pyrolusite. They are occasionally intermixed with limonite or occur in the vicinity of the latter; but characteristically form independent bodies and are low in iron. Their content in manganese reaches up to 55%. A fairly high silica content is traceable in many instances to included fragments of sandstone and chert, the presence of which is revealed only by breaking open the specimen.

Silver Peroxide and the Valence of Silver

The black compound formed on the anode during the electrolysis of silver-nitrate solution, and to which the formula $2Ag_2O,AgNO_3$ has been ascribed, is discussed by H. C. P. Weber, in a paper entitled "Silver Peroxide and the Valence of Silver," presented at the Pittsburgh meeting of the American Electrochemical Society. He considers the probable valence of silver in the oxide part of this formula, writing it either Ag_2AgO_4 by analogy to red lead, or $Ag(AgO_2)_2$ by analogy to magnetic iron oxide. Various electrolytic experiments lead to the conclusion that the last formula, $Ag(AgO_2)_2$, in which one-third of the silver is cathodic and diatomic and two-thirds are anodic and triatomic, is in harmony with his experimental results. This would make Ag_2O_4 the silver salt of an argentic acid.

The Commonsense of Mine Management

By HENRY M. ADKINSON*

Imagination, judgment and initiative are demonstrated to be essential in mining, and expert opinion is quoted concerning the loss in efficiency due to lack of these qualities in business practice. Examples are cited of the failure of old methods to meet present-day needs, and of how effectually the way to progress may be blocked by self-sufficiency.

IT IS a truism dangerously close to a bromide to say that never in our country's history was there a time when the need for efficiency of effort and the necessity for conservation of time and material were so impelling as now. All must by this time appreciate the need for the highest degree of personal effort and community coöperation, but when, in a desire to "do his bit," one tries to lend a hand in his particular field he seems fairly to be groping in the dark and to be accomplishing nothing more than before this urgency existed. When one was doing all that he possibly could, now that conditions require added effort it is not apparent just how exertion may be intensified and the results increased.

Management a Prime Factor in Industry

The proper direction of a business—its management—is the most important factor in any industry. If this one factor can be stimulated through conscious excitation of the mental qualities which go to make up the successful manager, the whole business must necessarily respond to the spur. The importance of effective management cannot well be overestimated. This is not a theoretical statement but is intensely and essentially practical—how much so can be realized from the two quotations following, from competent authorities on the subject. Nothing could be more matter-of-fact nor have a more direct bearing on our day-to-day problems than the *Monthly Bulletin* issued by the National City Bank of New York. In the July number there appears this comment on "Industrial Efficiency":

> A well-known engineer who is an expert in industrial practice has recently gone on record with the opinion that the industries of the United States on an average are not realizing over 20% of their possible capacity. . . . He says that we have scarcely begun to appreciate the gains that are possible under more effective organization.

If the country is not getting more than 20% effective results out of possible capacities, who or what is responsible for the loss of the 80%? On this point A. J. Hemphill, chairman of the board of the Guaranty Trust Company, one of the largest trust companies in the world, throws a high-power spot-light when he says in the July issue of the *World's Work:*

> In considering employment of funds in any concern, the greatest emphasis should be placed on the ability of the management. I would say that the most important consideration in any investment is management, management, management, and again management. It is not enough to know that it is honest; its ability in that particular business should be established. Ninety-five per cent. of the worth of an undertaking, I should say, is in the management.

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These statements indicate the source of a large part of the troubles and ineffective results encumbering modern business. If 95% of the worth of an undertaking lies in the ability and effectiveness of its management, and if only 20% efficiency is the measure of present possibilities, then of the lost 80% of effective results it is fair to attribute 76% to inefficient management. So management looms up as an important and indispensable factor.

Imagination, Judgment and Initiative Essential

Is it possible to take up any part of the slack in this business tackle? Are there any general principles of successful management that may be applied and amplified by executives through self-analysis and intensive training? Probably no ready-made formulas exist for success in business as each business presents its own problems, and even where the problems seem similar the same solution is not always applicable. But certain general principles hold the germ of success in all fields. A prominent financier makes certain mental qualities the basis of his selection of executives, and lays especial emphasis on imagination, judgment and initiative. Discussion of these qualties is bound to be philosophical. It cannot be scientifically exact. The essentially practical man will say that it is all very well to talk about imagination being necessary to the effective executive, but will want to know just how is imagination going to meet the problem of his payroll this week; just how is judgment going to help him on actual matters of fact where the answer is hard and fast, with only one way out, and how is initiative going to get him a supply of needed raw materials when there is none to be had.

The Futility of Ultra-Conservatism

Consider for the moment this point of view and grant that the objections are well taken, and that these qualities are altogether too philosophical and idealistic to be of value in meeting the problems of practical business. The alternative is to follow the customary business path, letting present methods direct each succeeding step, and following no plan imagined at the outset, no project preconceived and definitely outlined in the beginning. Such acceptance of conventional conditions inevitably creates the situation so well described by H. G. Wells in his analysis of the governmental attitude in "Mr. Britling Sees It Through," where Mr. Britling says:

> We had a government that seemed guided by the principles of Mr. Micawber, and adopted for its watchword, "Wait and see. . . ." We were too lazy, we were too negligent. We passed our indolent days leaving everything to somebody else. Was this the incurable British, just as it was the incurable Britling, quality? . . . Was the whole prosperity of the British, the flar-flung empire, the securities, the busy order, just their good luck? It was a question he had asked a hundred times of his national as of his personal self.

Of course it isn't just "good luck." It may now plainly be seen that the answer lies in the fact that in a moment of national emergency, when everything seemed headed toward destruction, some imagination-judgment-initiative called Lord Northcliffe gets to work. It analyses the situation and puts a Lloyd George on the job as manager of Britain's war. Then it wonders,

through its imaginative quality, if the same "in-the-rut" type of mind which had formerly been directing the military end might not also exist in the civil branch, the "wait-and-see" type, and finds it does. And the initiative quality of mind, in the face of apparently overwhelming opposition, shows the facts to the country—to the stockholders of the British Empire, so to say—and the board of directors is changed and a new Cabinet installed. The intensely practical management in charge of the nation's business couldn't analyze itself—thought it was doing the best possible under the circumstances—and the best results were obtained only when the executive mind trained in imagination-judgment-initiative supplanted the practical manager. The same thing is happening today in industries running below par in efficiency. Velvet rugs and mahogany furniture cannot substitute for the fundamental qualities, though for a time they may conceal their absence.

Three Requisites as Applied to Mining

The observation concerns general principles, but concrete facts are necessary to drive them home. Therefore to illustrate these principles wherein my applications would lie, because of my work as a mining engineer, I am drawing on personal experiences in the mining field. It is not possible to draw a line of demarcation where one mental quality begins and another leaves off, but these examples will serve to show what the combined qualities that make up the proper executive may accomplish. For several years a certain mine had been operated on a profitable basis, and returned a good income to its shareholders. Neither the president nor the general manager was a man of imagination, and while matters ran smoothly they ran on a level much below the plane of high efficiency. A change of management was urged by some of the directors, and after much persuasion and pressure this was brought about. Within 30 days after the new manager was installed the output increased 260%, dividends doubled and the surplus mounted by leaps and bounds. In the first month the net profits increased $40,000, and soon they were mounting at the rate of three-quarters of a million a year. Now, the new management worked with no equipment other than at the service of the old management. It merely brought vision—imagination, if you will—to the problem and saw what could be done through simple and seemingly slight readjustments all through the organization. Of the changes made no single one seemed of particular moment, but all in combination put the entire business on a higher plane, and gave the immensely profitable result. It was judgment, knowing what rearrangements were feasible and proper; and it was initiative, getting out of the rut of the obvious routine. These qualities in 30 days returned an actual cash payment of $40,000—well worth while even to the "practical" mind.

Executive Narrowmindedness Chokes Development

Again, a certain mine is owned by men having at their command all the money that is needed to accomplish a splendid piece of constructive work. Yet year after year, for 20 years, the mine has remained idle because they see it only as a small property and cannot imagine it as a large and highly profitable business, run as an independent industrial unit. They also lack the initiative to investigate the best metallurgical methods and do not understand how to engage the best brains and bring them to bear on the problem. This really doesn't seem a difficult thing, but it is. The best brains go with broad-gage minds, and the man whose mind leans toward doing things in a small way will get small men to help him, and he will achieve a small result. In this particular instance the product of the mine is silver and copper, both of which are now at supernormal prices in the market. It would seem that even a narrow judgment would appreciate that the obvious thing is to market these products now. But this particular judgment does not apparently realize that to a degree as never before has time become the essence of action and that all effort should be concentrated now without delay. Failure to grasp the situation is due solely to executive narrowmindedness, and not to lack of money or labor.

One more instance: A certain large mining corporation retains in an important executive position a man who does not get nor hold the goodwill of its customers. A competitor told me that even if this corporation felt that its manager was too expensive to be retained, it would be good business for the competitor to pay the salary of the corporation official because of the business which was diverted to the competitor through the unpleasant personality of the corporation manager. Needless to say the competitor is affluent, and has a broad-minded, broad-gage management in its highest executives, but the corporation with the unpleasant manager held a place in the industrial procession two jumps ahead of the sheriff before the war prices of metals came and saved the day. This corporation represents millions of invested capital, and the wonder is that the executives at the top can remain either ignorant of, or ignore, the conditions of personnel which so profoundly affect its fortunes.

Old-Timer Not Always Best Man for the Job

I sat last month with a group of mine directors who had recently bought a property, and who were continuing as manager the man who sold them the mine. (Parenthetically I may say that mining engineers recognize this procedure as one of the most fruitful causes of mine failure. It is done on the theory that the man who has been in charge of the mine knows most about it, but this is a fallacy that has cost many men hundreds of thousands to unlearn.) This manager was the only "mining man" on the directorate. The suggestion was made to this general manager, a relic of the metallurgical days of the '70's, that he would greatly increase his profits by installing a flotation method to which his ore was peculiarly susceptible. His reply was that "flotation is yet in its experimental stages, and I propose to crush my ore with rolls and concentrate it with jigs." So he chose the method that would be certain to show the greatest losses, calculated at a minimum of $15,000 a month. The manager's judgment was faulty; it failed to recognize, and the initiative was lacking to learn, that on the basis of tonnage treated flotation is today the leading single metallurgical process. About 30,000,000 tons are annually treated by flotation, no other method equalling it in tonnage handled. The directors had thought their manager the best they could get for their business! Why did they not have enough imagina-

tion and initiative to appreciate that many hundreds of men are trained in that profession? Why did they not try to get the best manager possible, even though their choice might happen to fall on one who did not possess the happy qualification of being able to induce them to buy the mine?

An Instance of Successful Operation Under Leasing System

Not all examples that might be cited are along the line of carping criticism, and to maintain the proper ratio one good example will offset the four horrible ones. A certain company is operating its mine on a leasing system. This is commonly held to be the last resort and is used only when the orebodies are approaching exhaustion and the mine is *in extremis*. As a matter of fact the general manager is broadminded, and he believes so thoroughly in the efficiency of accurate accounting that he is able to select the most profitable method with no uncertainty. His operations on both the system of company operation and leasing operation gave exact figures, and by far the most money is made by the company, and larger dividends are paid, under the leasing system. So in the face of natural opposition he installed that system, with the result that his company is earning more money, the mine is in a better physical condition, the holdings of the company have been constantly enlarged, and the profits of the leasers are greater than they would be under the day's pay method. Therefore the workers are more contented, and the net result is an excellent industrial organization. Imagination-judgment-initiative have had their place in determining the attitude of the management, and the outcome is a highly profitable one from any viewpoint. These are elementary qualities, but backing them up and making them effective in mental make-up must be self-confidence, the confidence that, convinced of the accuracy of its judgment, goes ahead to develop along the lines aimed at. But self-satisfaction is a sure antidote to progress, and there, in all probability, lies the answer to the lost 80% in efficient capacity. Satisfied with present progress, no effort at self-analysis is made, and a chosen field of work develops its possibilities only when a new mind is brought to bear on the problem, a mind which has the qualities, even in a small degree, which make for better organization and more intensive results.

There are many volumes dealing with the development and training of mental qualities, but the first step is to recognize one's deficiency. As soon as this is taken, judgment and initiative begin to leaven the whole lump, and ways to reach the goal take form from within.

Progress of Alaskan Road

Before the end of next season the first regular train service over the coast end of the Alaska Government Ry. will be established, according to a statement by William C. Edes, chairman of the Alaska Railroad Commission. Mr. Edes said that because of unsettled war conditions, it was impossible to set a date for the completion of the road from Seward to Fairbanks, but that the work was considerably more than half finished, not having been curtailed so far because of the war. The railroad is to be 508 miles long.

The Cascade Method of Agitation for Selective Flotation of Sulphides

A method for the selective treatment of sulphide ores by flotation is described by T. H. Palmer, under the title, "The Cascade Method of Agitation," in the *Mining and Engineering Review*,[1] of Melbourne, Australia. Mr. Palmer, who is general manager of the Junction North mine, states that the process was conceived, perfected and installed at his company's mill at Broken Hill, N. S. W., and that it differs somewhat from that process employed at the Central mine, illustrations of which appeared on p. 393 of the *Journal* of Sept. 1, 1917. The

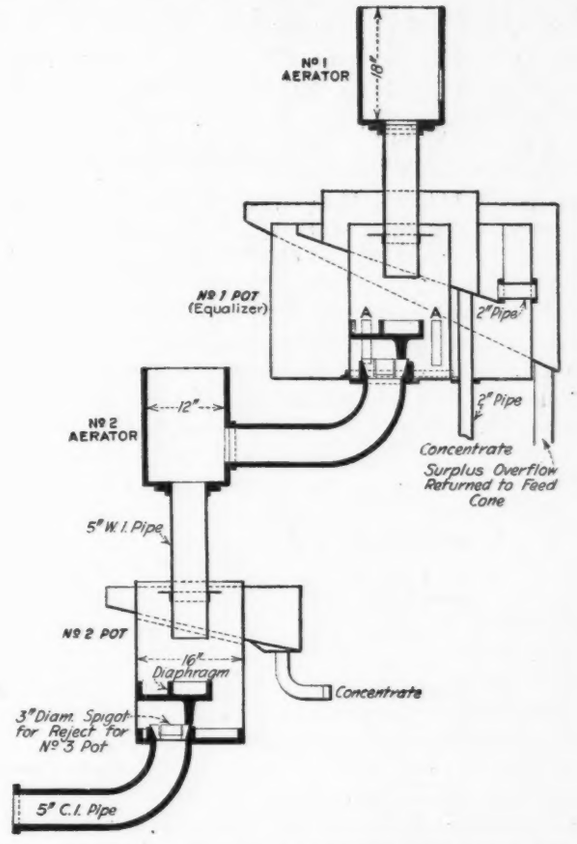

FIG. 1. SECTIONAL VIEW OF CASCADE-AGITATION APPARATUS AT JUNCTION NORTH MINE, BROKEN HILL, N. S. W.

Junction North plant consists of two sections, each with six pots, as shown in Fig. 2, for lead and zinc respectively. In each section the six pots are placed in series, in echelon one below the other, the pulp being delivered from an elevator into the top one and falling through the set by gravity. The plant was completed about August, 1914, and after being tested for nearly a year, was capable of treating 22 tons of ore per hour.

The pots are cylindrical in shape, 16 in. in diameter and 24 in. high. Immediately above each pot is an "aërator," consisting of an open receiving box, 12 in. square, fed by a 5-in. bend leading from a 3-in. spigot in the bottom of the pot above. The square shape of the aërator causes the pulp to swirl, and entangle a quantity of air with it, as it drops into a 5-in. vertical pipe and down to a diaphragm splash plate in the center of the separating pot, where the air is churned into the

[1]Vol. IX, No. 107, pp. 296-298, Aug. 6, 1917.

pulp and forms the froth which carries the concentrate over the periphery of the pot into the tray and launder. The diaphragm arrests the falling pulp, distributing it throughout the pot and ensuring a thorough admixture with the entangled air. The cylindrical pots, having the concentrates overflow all around the periphery, permit short travel and rapid take-off of the aërated particles, which are said to be essential in the selection of sulphide of lead by a hot- or cold-water process, particularly with sandy material.

From the first series of six pots a float of lead concentrates is taken and the rest of the pulp runs from the spigot of the last lead pot to the second elevator, with acid and oil additions[2] for delivery to the second series of pots, known as the zinc section. The first or top pot of each section is called the "equalizer," its special function being to balance any irregularities in the flow of the feed from the elevator, so that its discharge spigot will deliver a uniform feed to the second pot. It has four slots cut in its side near the bottom, two of which are indicated at *A* in Fig. 1. These open into a concentric cylindrical pot, 40 in. in diameter, provided with two annular overflow rings set slightly lower than the concentrates-overflow ring.

The whole system is said to be self-operating, requiring no attention. All pots have the same-sized spigot and the height of each successive pot is reduced slightly to allow for the concentrates removed from the pot above. The pots are thus kept full and the froth overflows constantly from each without any hand regulation or danger of excess overflow of liquor or gangue to spoil the grade of the concentrates.

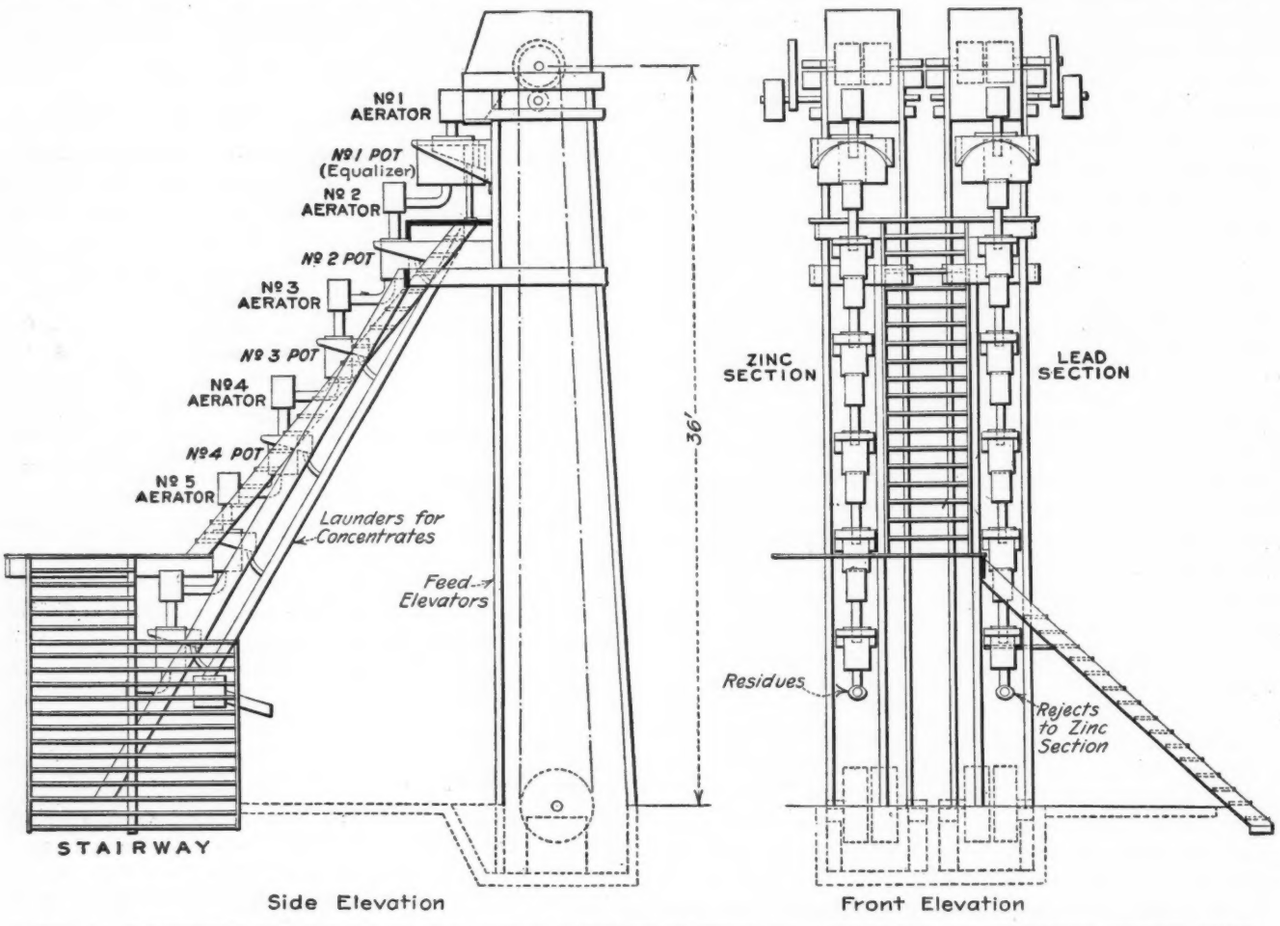

FIG. 2. SELECTIVE-FLOTATION PLANT, USING CASCADE METHOD OF AGITATION, AT JUNCTION NORTH MINE, BROKEN HILL, N. S. W.

[2]Presumably oil and alkali, or merely a minute quantity of oil should be added to the ore before feeding to the lead section.—Editor.]

Phases of Employees' Injury Suits

By A. L. H. Street*

In affirming judgment for $7500 damages in favor of a miner for injuries—due to falling rock—sustained while operating a machine drill, the Idaho supreme court holds that, although it was plaintiff's duty to pick down and remove all dangerous ground around his place of work, it was not his duty to examine any other portion of the stope in which he was working beyond his immediate working place, and that he was entitled to assume that his emloyer had caused the proper inspection of such other portions of the stope to be made and had found them to be in a reasonably safe condition. (Cnkovch vs. Success Mining Co., 166 Pacific Reporter, 567.)

It is further decided by the court that, considering the fact that the accident complained of resulted in severe and permanent injuries which will prevent plaintiff from engaging in physical labor, and that he was only 31 years old and had previously earned $3.50 daily, an award of $7500 damages was not excessive.

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Mining Methods at Chapin Mine, Michigan*

The factors entering into the selection of a final method of mining are often only known after considerable experimentation. At the Chapin mine several standard systems were tried in combinations designed to meet local conditions and a final system was evolved that satisfactorily meets the requirements of both high extraction and low cost.

WHEN the Chapin mine was first opened, little or nothing was known of the conditions that were to be encountered, but they were learned as mining progressed. Naturally, the early miners sought to apply such methods as they knew and had used in mines where they had previously worked. As mining progressed, they saw that the Chapin orebody had certain characteristics peculiar to itself and they made such changes in their mining methods as were necessary. Out of all these changes have grown the present methods, which are so well adapted. As these methods are the outgrowth of former ones, it is advisable to describe the latter in order to get a comprehensive idea of those now in use. The locating and sinking of shafts also played an important part in the history of the Chapin mine. A large number of shafts have been lost at the Chapin mine, owing to the fact that the early operators were not acquainted with the conditions existing beneath the surface. There were originally three companies at work—the Chapin, the Ludington and the Hamilton. The three fees were later acquired by the Chapin, and the whole has since been worked as one mine. During the time that the companies were operating independently, the Chapin and the Ludington owned the apex of the ore, the Chapin being on the east and the Ludington on the west. The Hamilton was north of the Chapin, and while the surface was almost wholly dolomite, it was certain that the dip of the formation would carry the ore on the property at depth. The three companies began the work of recovering the ore, the first two knowing that they would encounter it at shallow depths and the other knowing that it could be reached only at great depth and only by means of a hanging-wall shaft.

Conditions Governing Shaft Locations

Selecting a shaft location at the Chapin mine has always been a difficult problem. Not only are most of the ordinary problems to be solved, but there are others that are peculiar to the Chapin alone. Instead of there being one or two orebodies there are a number, and in order to mine from all these bodies to the best advantage, it is desirable to have each shaft easily accessible from all the bodies. But a shaft must be so placed that it will not encounter any ore or any caving ground, as the ore caves readily, as does also the adjacent slate with its seams of talc. Now that we are able to look back on facts not known to the early miner, it is evident that all the ground now caved would have caved ultimately regardless of the method of mining in use, and that all the shafts in the ground now caved would have been lost under any method of mining. In view of this knowledge all idea of any but foot-wall and hanging-wall shafts has been abandoned.

The difficulties of sinking in the hanging wall are pretty well understood. A shaft so situated will have to penetrate a thickness of dolomite, the amount depending on the distance of the shaft from the slate-dolomite contact. It will encounter talc slate and will have to contend with the difficulties caused by its swelling. After passing through the hanging slate, the orebody will be encountered where the shaft can be maintained only by leaving a large amount of ore as a shaft pillar. In the dolomite, watercourses are quite common and one of them may be encountered at any time. This is especially true near the talc slate which marks the contact. It might be suggested that it would be better to keep all shafts and all mine workings away from the dolomite, and thus avoid all the water known to be circulating in that formation. It would be poor policy, however, to attempt to leave so much water bottled up under the head that it is known to have, for sooner or later it would break through some weak point and flood the workings with amazing quickness and perhaps disastrous results. As a matter of fact the presence of the water in the dolomite is an argument for sinking a shaft in that formation rather than keeping away from it, because the water can then be conducted to the pumps at the shaft without conducting it across the orebody, which would be necessary if the shaft were located in the foot wall.

Sinking a shaft in the foot wall means sinking in the slate in which are scattered the lenses of ore that are to be mined. It is possible that a new and unexpected lens of ore might be encountered at any time. However, knowledge of the ground, gained from underground operations and from diamond drilling, makes it quite possible for the present-day operators to choose the best sites for shaft locations.

Freezing Method Used in Starting D Shaft

After the proper site has been chosen, shaft sinking has not been a serious problem, the surface being shallow and easily penetrated. However, there was some difficulty in getting D shaft through the surface, which difficulties were overcome by using a freezing process. At the point selected the surface material was known to be nearly 100 ft. thick—largely quicksand. The method employed was to freeze a wall around the ground through which the shaft was to be sunk and to work within the protection of the frozen wall. Twenty-six 10-in. pipes, on a circle 29 ft. diameter, were driven to ledge. In each of these pipes was placed a water-tight 8-in. pipe closed at the lower end. The larger pipes were then drawn and the ground was allowed to close about the smaller pipes, whose distances apart were 3½ ft. from center to center. A freezing mixture was circulated through the pipes, causing the ground to freeze. Two qualities were necessary in the mixture used; it had to be a medium that could be made to circulate through the pipes, and it had to have a low freezing point. The mixture used was a saturated solu-

*Paper presented by W. C. Gordon, geologist, Oliver Iron Mining Co., Iron Mountain, Mich., at the annual meeting of the Lake Superior Mining Institute, Birmingham, Ala., Mar. 13-16, 1917.

tion of $CaCl_2$ which has a freezing point of —40°. The solution was conducted to the bottom of the 8-in. pipe through a 1½-in. pipe, where it left the smaller pipe and returned to the surface through the larger. This cold solution in the larger pipe abstracted the heat from the adjacent ground and froze it. The solution was cooled at the surface, its heat being absorbed by evaporating ammonia which had been previously compressed to liquid form. After 15 days of freezing, excavation was begun, and in 135 days the shaft had reached ledge, though it was necessary to do some further work under the protection of the frozen wall. The cylinder of frozen ground, in the center of which was the shaft, was found to be more than 50 ft. diameter. Troubles have at times been encountered in shaft sinking below the surface covering. Talc seams have caused trouble by swelling and crushing the timbers.

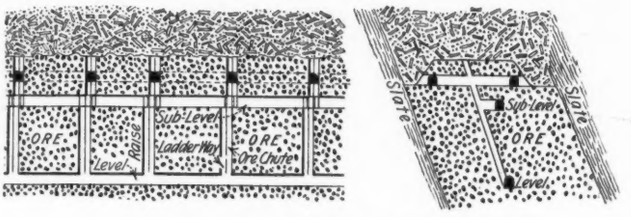
In the first attempts at mining at the Chapin mine the ore was removed from foot to hanging wall by back-stoping, the hanging wall being supported by stull timbers. It was soon learned that some changes were necessary because the hanging slate, being soft and friable, crumbled away from around the stull timbers and allowed them to loosen. To correct this, headboards were placed on the end of the stull timbers against the hanging wall so as to cover as much of the wall as possible. Even this did not overcome the difficulty. Moreover, the vein was becoming so wide that timbers long enough to reach across the excavation could not be obtained. To overcome this new difficulty a layer of ore was left along the hanging wall and the excavation was made only wide enough for the timber to reach across. It was soon evident that the layer of ore left could not be supported, and also that too much ore was being lost by this method of mining. A wholly new method was necessary.

Room-and-Pillar Method Abandoned

At this stage the room-and-pillar method was introduced. A drift was driven the length of the orebody, along the middle where the ore was wide, and near the foot where it was narrower. The ore was then laid out into rooms and pillars, the standard pillar being 18 ft. and room 20 ft., though there were many variations from this standard. In opening a room, a drift was driven from foot to hanging wall the full width of the room. The ground about this excavation was supported by sets made of large square timbers placed eight feet apart from center to center. Each set rested on a sill which extended two feet into niches cut into the pillar on either side of the room. Both the back and the sides were lagged. A raise connected the back of the room with the level above. After the first cut was taken from the room, a second cut was taken from immediately above and sets of timber placed in a similar manner. In this way cut after cut was taken from the back of the room until the room of the level above was reached, at which point the timbers of the two rooms were connected and the weight taken off the sill of the room above. While a room was being opened, the broken ore fell to the lagging on the lower set of timbers; from there it fell to the floor through openings along the side of the room and was shoveled up by the trammers. At a later date chutes were put in and the ore was drawn directly from above the lagging into the tramcars. By this method room below room were joined together with the result that rooms and pillars were constantly growing higher.

Two serious difficulties were soon encountered in this method of mining. A vast amount of ore was being left in pillars which must be recovered and the pillars soon began to crush under their own weight. Ignoring the first difficulty, an attempt was made to correct the second by using square sets, the timbers of which were cut in lengths of six feet and framed together. But even these were not sufficient to hold the ground. There was soon such an increased amount of crushing that the surface began to give way. It became imperative that some method be introduced that would support the pillars until such time as the ore could be recovered from them. Furthermore, it was not advisable to open more rooms. It had come to a time when new methods were an absolute necessity.

This method was abandoned and new methods introduced which, it was hoped, would make possible the recovery of the ore left in the pillars, and also the mining of the other ore without encountering the difficulties incident to the "room-and-pillar" method. Accordingly,



LONGITUDINAL AND CROSS-SECTION OF CHAPIN OREBODY

filling of the old rooms was begun. The first filling material was the surface covering of the orebody, which was stripped off and dumped into the rooms through a small shaft in the back of each. Sandstone was used to complete the filling. In this manner each room was filled, and a room thus filled became in itself a pillar which, it was hoped, would support the ground while the original pillar of ore was being removed.

The pillar was approached by a crosscut driven from a drift in the foot-wall slate parallel to the orebody. The drift was continued through the pillar close to the lagging of the sandstone-filled room. A cut the width of a drift and running with the formation was then taken from the base of the pillar along the hanging-wall side. The opening from which the ore was thus removed was filled to the back with sandstone which was brought down from the surface and shoveled into it. Another cut was then taken from alongside of, and on the same level with, the first cut and the opening similarly filled with sandstone. When a cut had thus been made across the base of the pillar of ore, a second slice was taken in a similar manner, the broken ore falling upon planking which was laid on the sandstone filling and from which it was shoveled. In this manner it was hoped to remove the pillar. The timber and sandstone required in the work were received through a raise in the pillar. Only a small amount of ore was removed in this manner because the ground was heavy, and the amount of filling required was great.

To recover the ore from the parts of the orebody that had not been attacked by the room-and-pillar method,

a drift was driven in the foot-wall slate parallel to and only a few feet distant from the orebody. At the same time a similar drift was driven in the orebody. The two drifts were connected at intervals by crosscuts. The drift in the slate was the main haulageway, while the other was used as an opening from which the ore was attacked. The ore was removed by back-stoping, and the stopes were filled with sandstone quarried at the surface and sent underground. The rock that was taken from the drifts and other dead workings was also used for filling.

It took a large force of men to quarry the sandstone, load it into cars, send it underground and distribute it in the stopes. Where the orebody was narrow and firm, it was attacked by longitudinal stoping, but elsewhere transverse stoping was used; that is, the cuts were made across the strike of the formation. In each case the broken ore fell on planking laid on the sandstone filling which was always kept near the back. In the transverse stoping gangs of men were started at work 50 ft. apart in the ore drift, and each gang drove a crosscut from foot to hanging wall eight feet high and nine feet wide. The opening made was filled with sandstone, and a similar cut taken from alongside, and that opening was also filled. In this manner the work on the level was continued until completed. As the sandstone filling was put in, planking was laid on it for the broken ore to fall on. A second slice was taken from the back of the stope in the same manner as the first and the opening filled with sandstone. This work of slicing and filling was continued until the level above was reached. If at any time a part of the back appeared weak, it was supported by a prop. The sandstone used for filling was sent from the level above through a winze. The ore reached the main haulageway through a raise put up from the side of the slate drift and connected with the stope at the working elevation by a crosscut. The ore was trammed from the stope through the crosscut and dumped into the raise, the enlarged bottom of which served as a pocket from which it was drawn into cars. These stopes were large openings reaching from foot to hanging wall and for some distance along the strike. Beneath this immense back the miners worked breaking ore and the fillers trammed sandstone from the chutes.

This filling method had a great advantage over the room-and-pillar method in that there was a lower timber cost and no ore was left behind as pillars, which was more important. On the other hand, it necessitated a great amount of deadwork because of the drifting and crosscutting in the slate and the still greater amount of work necessary to furnish the sandstone filling. Moreover, the ground not only in the old pillars, but also in the main stopes, was very heavy. It was evident that a better and less expensive method of mining was needed for this orebody.

Conditions of Stoping Summarized

By this time the following factors regarding the Chapin orebodies had been determined: The ore was soft, prone to cave and methods of attempting to support it had failed. Not only would the undercut ore cave, but also the adjacent slate, and ultimately all the surface underlain by the caving ore and slate would cave. Any shaft in, or surface structure upon, this caving ground would sooner or later become valueless. Any method of mining that did not take all these facts into account could not be cheap and efficient. It was desirable to adopt a method in which the caving tendency of the ore would assist rather than retard the work. The present methods were adopted in the hope that they would answer all these requirements, and they have served the purpose well.

Combination Top-Slice and Sublevel Caving System Adopted

The working shafts are in either the hanging or the foot wall, and the orebody is approached from these shafts by drift or crosscut as required. The orebody is opened by a drift in the ore running throughout its whole length. This drift is the working level to which all the ore between it and the next level above is sent and along which it is trammed to the shaft and hoisted to the surface. Experience has taught that it is not advisable to make the level openings more numerous or elaborate than actually required because the constant crushing of the timbers makes a large amount of repair work necessary. Levels are laid out 100 ft. apart. The work of developing each succeeding lower level is planned so that the new level will be ready for mining work when the ore is exhausted from the higher level. After the level is laid out, raises are put up from the side of the drift to within about eight feet of the level above, but such of them as are required are holed through to aid ventilation or acquire traveling ways. The raises are generally in ore throughout their length, but there are cases where it is necessary to have part of a raise in slate. At the time the raises are being put up a sublevel is driven midway between the two levels, and connected with the raises by crosscuts. This sublevel affords easier communication between the stopes and facilitates the work of getting timber and supplies to the working places.

The openings are made for the actual mining ore near the tops of the raises and the number of men that can be put at work depends upon the number of raises in which work is being done. Every additional raise entails an additional expense for opening and maintaining. Evidently, then, it is desirable to have only as many raises as are necessary to work the number of men desired. The best practice seems to be to place the raises from 35 to 50 ft. apart. At a point about 15 ft. below the floor of the level above, a crosscut is driven from each raise to both the foot and the hanging wall of the ore. At each end of each crosscut a drift is driven in each direction in the ore. The drift along the foot wall is so located that the bottoms of the outside legs of the sets rest upon or close to the slate, while the hanging drifts are so located that the outside ends of the caps touch, or nearly touch, the hanging wall. If we assume that the raises, and therefore the crosscuts, are 50 ft. apart, then the drifts along either the foot or the hanging wall will meet when they have been driven 25 ft. from the crosscut. However, they are not driven to meet as a thin wall of ore is left. It is at the end of this short drift that the actual stoping of ore begins. As the miner stands at the end of the drift there is a thickness of eight or ten feet of ore in the back above him. He begins work by attacking the ore at the end of the drift. He fills his car as

often as possible, and takes the ore back and dumps it into the raise. When he can get no more ore, he shoots out the last set that he put up in the drift, which allows the ground about it to fall from the sides and back, generally of its own weight, but if necessary, it is shaken loose with dynamite. It is then shoveled up and trammed to the raise. Set after set is shot out until all the ore back to the crosscut is mined. In like manner the ore on the other side of the drift is mined. Similar work is done at the end of the crosscut that has gone from the raise to the opposite wall of the orebody. As the ore is thus removed, the thick covering of broken lagging and other waste material that has collected above it settles down and fills the space from which it has been removed. This waste material covers the ore like a mat and keeps it clean. When the miner has taken the ore from around the first drift and has drawn back to the crosscut, he makes a second drift in the same manner as the first except that it is a few feet nearer the raise. The operation is repeated until all the ore is mined back to the raise. At such time as best facilitates the work a second crosscut is driven from the raise about 16 ft. below the one being mined out. The work of crosscutting, drifting and mining is repeated as it was done immediately above. In like manner work is done about all the raises. As mining continues, the orebody is lowered and the lower level is approached in cuts of about 16 ft. each. When the main level is reached, the ore is mined from about it in the same manner; the level really becomes a sublevel when the ore about it is being mined. The nature of the ore makes it advisable to remove the ore between the two levels in about six slices—that is, about 16 to 17 ft. to the slice—which means that from eight to ten feet of ore is drawn from the back of the drift. An attempt was made to divide the 100 ft. into four parts, but the results were not satisfactory.

Haulageway Maintenance Difficult

The orebody was opened on some of the main levels by two main drifts in the ore, one along the foot and one along the hanging wall, these being connected by crosscuts. It was hoped that this method would enable a more advantageous distribution of the working raises and would facilitate haulage on the level. The objection was that the numerous openings in the orebody made too much repair work necessary.

The methods described are followed in the main, but variations are always made to meet such exceptional conditions as might be encountered. In the work of removing the pillars from the old workings it is often difficult to select suitable sites for raises.

It is not necessary to support the ground around many of the openings for any great length of time; consequently, most of the timber used is small. However, those drifts in the ore which have to be held for some time require considerable repair work, even with the heavy timbers that are used; but they are not made any larger or more elaborate than is necessary. Ultimately they, too, are caved down and mining operations removed to a lower level. No pillars of ore are left behind; no ground is left in such a way that it is liable to cave and ruin the workings; and no great amount of heavy timber is used as with the room-and-pillar method; no great amount of dead work is done as with the filling method, nor is a large body of heavy ground undercut. There are some timber costs, and dead work is done, but both are small in comparison with past methods. Moreover, little or no ore is lost.

Control of Imported-Tin Sales

At the request of the War Trade Board the American Iron and Steel Institute has voluntarily and without compensation accepted the duty of acting as consignee of all importations of pig tin, chloride of tin and tin ore from foreign countries. A sub-committee in pig tin consisting of John Hughes (chairman), E. R. Crawford, John A. Fry, A. B. Hall and Theodore Pratt, with offices at 61 Broadway, New York, has been appointed to act for the institute in an advisory capacity. A bulletin (No. 1) covering the rules, regulations and forms to govern the importation and release of tin, as approved by the War Trade Board, was issued on Nov. 22, 1917. Consumers, jobbers, importers, dealers and producers of tin had added their request to that of the Government urging the institute to act in this capacity, as an insurance against interruptions to their business.

The institute has agreed: (1) To receive applications from consumers, jobbers, importers and dealers, to be approved by the War Trade Board as recipients of tin, and to transmit same to the War Trade Board for its decision. (2) To transmit the approvals, by cable if necessary, to representatives in London, or elsewhere, so that they may coöperate with the exporters, if required, in obtaining export licenses from foreign countries, and in making shipments in accordance with necessary regulations. (3) To supervise importations into the United States and sales therein, through necessary trade channels. All persons desiring tin are required to fill out and execute an application according to forms provided and to forward same to the institute, which will submit the names to the War Trade Board for approval. The original applications are to be filed at the New York office of the sub-committee on tin, and copies of the list of approved names will be filed with representatives of the institute at the Rialto Bldg., San Francisco, at the branch offices of the War Trade Board through the United States, and with American commercial attachés, consular representatives and diplomatic officers in foreign countries from which tin is imported, who are authorized, with custom-house power of attorney, to endorse bills of lading, as required by the U. S. Treasury regulations. These representatives will endorse bills of lading covering importations of tin consigned to the institute only when the guarantee requirements have been satisfactorily fulfilled and the endorsement of such bills of lading has been properly authorized.

All importations of tin from foreign countries are to be consigned to the American Iron and Steel Institute with marginal bill of lading clause reading "notify," followed by the name of the owner. Upon receipt of documents by the importer or receiver in this country, the bills of lading are to be presented to the American Iron and Steel Institute or its nearest authorized representative by the importer, accompanied by an undertaking and guarantee, in one of the forms approved by the War Trade Board.

A record will be kept by the American Iron and Steel

Institute of all importations of tin released to consumers, jobbers, importers and dealers under the guarantees which will show the particulars of importation, indicating the shipper, the importer, the consumer or jobber to whom the tin has been released, and any other data necessary to indicate its final disposition and consumption. Furthermore, on parcels of tin released for jobbing purposes, this branch of the trade will be required to take guarantees from customers and furnish monthly statement to the institute of all sales or forms provided for that purpose, so that the final disposition and consumption of each parcel will be accounted for. Parcels of tin not to exceed 25 gross tons may be released to importers or dealers to carry in stock for resale to consumers in lots of five gross tons or multiples thereof.

The record of the quantities of tin released to each consumer, jobber, importer and dealer will be constantly compared with consumers' and jobbers' actual requirements as reported to the institute, and will be checked from time to time by the Government inspection of consumers', jobbers', importers' and dealers' books and records. Reports at regular intervals will be required from consumers, jobbers, importers, dealers and producers, showing stocks on hand at a given date, actual consumption and other particulars. A compilation of these reports will be made by the American Iron and Steel Institute for the information of the War Trade Board. Since issuing the above-named regulations the Government has commandeered all tin assaying over 99.75%; tin below that grade is not to be attached.

Desert Haulage Problem Solved by Caterpillar Tractors

The cost of transport over long stretches of desert country has long been a barrier to the profitable exploitation of known mineral deposits. For years this was the case with the White Mesa copper mine in northern Arizona. This silicate-of-copper deposit is situated in Coconino County, about 120 miles northeast of Flagstaff, at an elevation of 7000 ft. on what is known as the White Mesa. The deposit is now being worked by the Navajo Copper Co., which has been shipping 15% ore. The deposit is expensive and the ore carries from 2½% upward of copper. It occurs in a white sandstone and the outcrop, about 600 ft. wide, may be traced for 10 or more miles. The present workings are 97 miles from the nearest railroad station, the Arizona Lumber and Timber Co.'s camp No. 1, and available water is 24 miles distant. The existence of this deposit has been known for more than 40 years, and several attempts to work it have been made.

About 10 years ago ox teams were used to haul the ore, but the project was a failure on account of the high cost. Two years or so ago motor trucks were given a trial. The road to Gap, 24 miles from the camp, is extremely sandy, and teams were used to this point; motor trucks completed the haul to Flagstaff, a distance of 100 miles, over fairly good roads; but the cost is reported to have been over $100 a ton, and the project was soon abandoned. Tractors similar to the present caterpillar type were introduced later, and the ore was hauled in trains 59 miles to the bridge spanning the Little Colorado River. The remaining 38 miles to the railroad was covered with motor trucks. The work was done under contract and reduced the hauling cost to $35 per ton, a substantial saving over the former method, but at best a high tax on the profits. About this time the engineers of the Holt Manufacturing Co., made an examination of the problem and reported recommendations which have proved successful; according to *Caterpillar Times*, the Holt house organ, the cost of hauling over the distance of 97 miles from the mine to the railroad has been cut to $11.40 per ton.

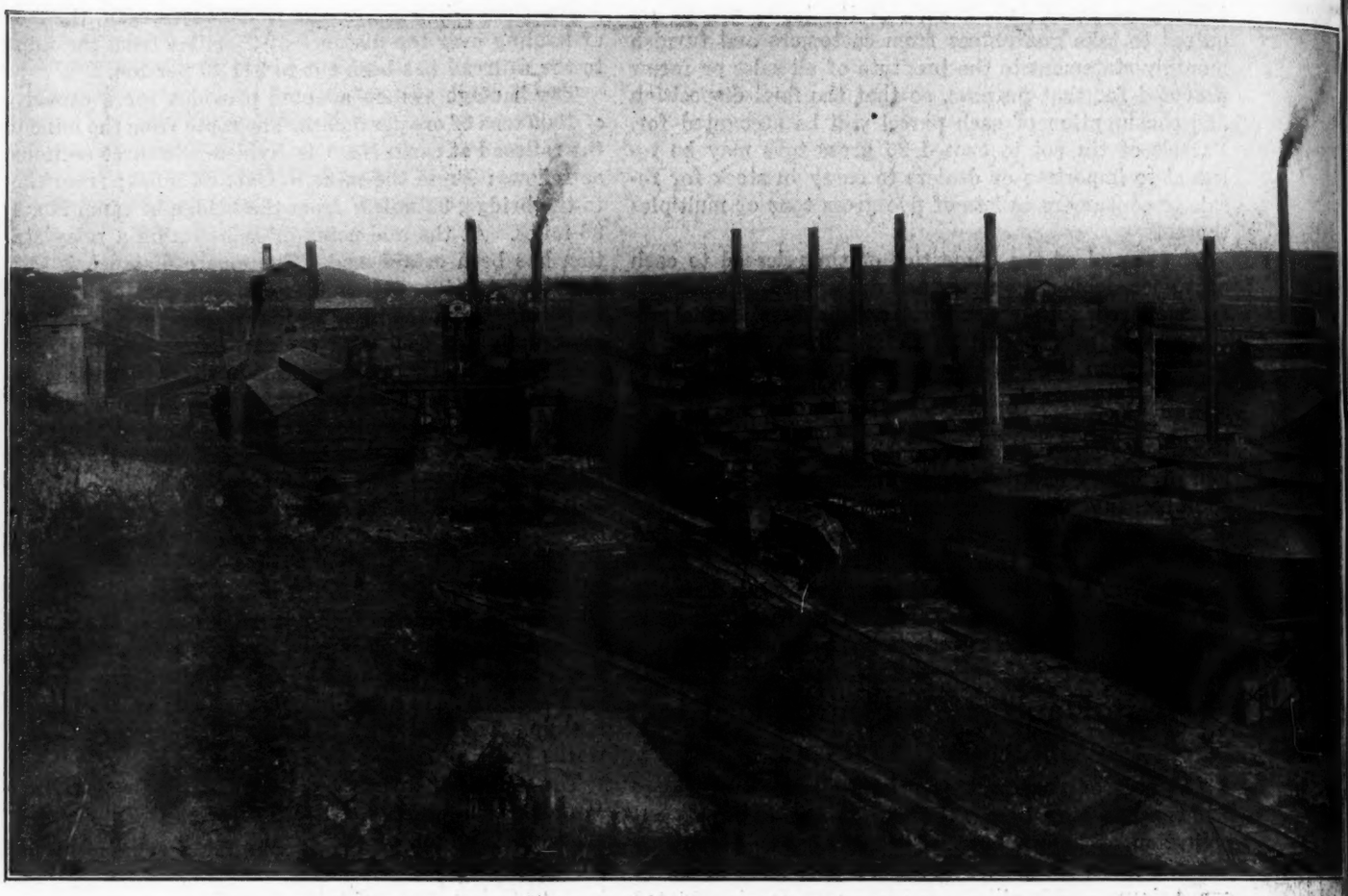
The haulage system adopted provides for a capacity of 1500 tons of ore per month. The route from the mine to the railroad at camp No. 1 is divided into three sections, as follows: From the mine to Gap, 24 miles; from Gap to the bridge, 35 miles; from the bridge to camp No. 1, 38 miles. At the mid-point in each section a relay station has been established. The entire distance is covered by caterpillar No. 75 tractors, hauling wagon trains in pairs. From the mine two tractors with 24-in. tread start daily for Gap with trains of ore. At the same time from Gap two more tractors with 20-in. tread start for the bridge with similar trains. Simultaneously two tractors drawing empties start back toward the mine from Gap. At the relay station midway between the mine and Gap, the four tractors meet, each having traveled a distance of 12 miles. Here, relief operators change shifts with the drivers, and, changing tractors, on account of the tread difference, complete the trips respectively to Gap and to the mine. The same schedule is followed in each of the three sections, the loaded trains being passed on toward the railroad and the empties returned to the mine. Five tractors are used in each section, four being in constant service and one in reserve. The men work 10-hour shifts and each tractor works three shifts per day.

The success of this enterprise in reducing wagon haulage costs to a figure within the limits of profitable operation on 15% copper ore should add materially to the potentialities of many deposits heretofore neglected on account of the transportation problem.

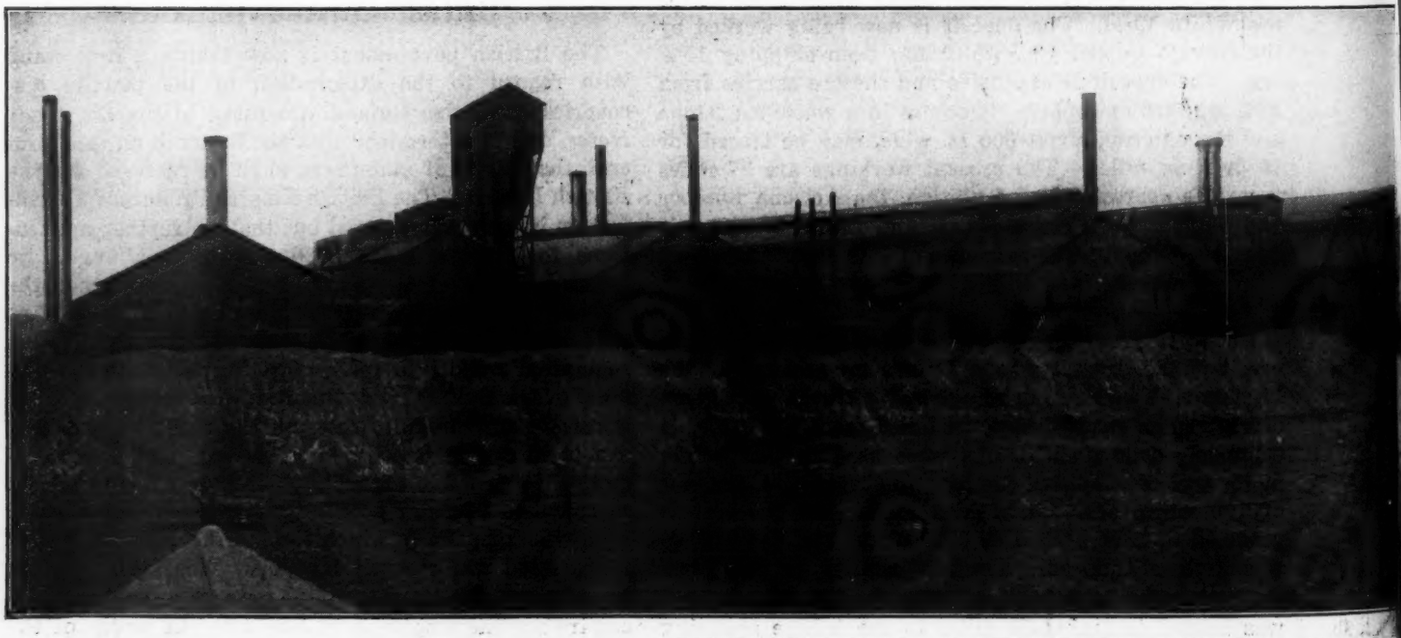
British Guiana Bauxite

The British government is now taking a firm stand with regard to the exploitation of the bauxite discoveries in British Guiana, according to *Empire Trade Notes*, and is determined that the first call on this mineral, the source of aluminum, shall be reserved for the British Empire. The British Empire Producers' Organization has already pointed out that no further applications for bauxite lands in British Guiana are to be granted till after the war. But it appears that the government has gone further than this. A portion of the bauxite won by holders licensed before the above regulation came into force must be placed at the disposal of the British government at a certain price. The government, moreover, reserves the right to limit the export to countries other than British, and at its discretion to prohibit export altogether. A large export shipment to a foreign country of British Guiana bauxite won by a company in which foreign interests are partly represented was recently held up. This determination to conserve in the future the mineral wealth of the empire for the empire is in line with the policy of the British Empire Producers' Organization.

General Views of Mineral Point

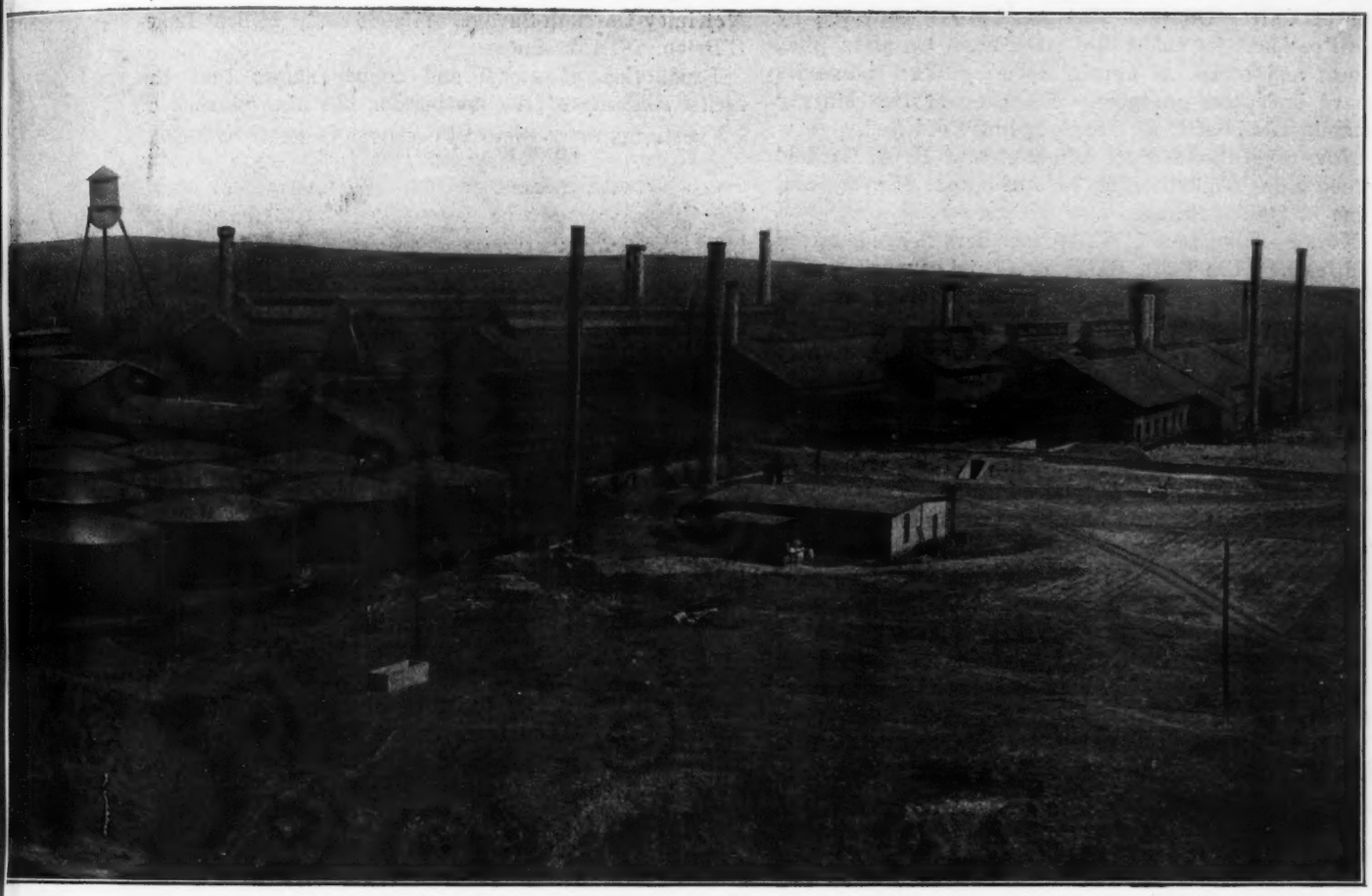


ZINC SMELTING PLANT, COMPRISING 9068 RETORTS, AND 250-TON



DISTILLATION PLANT OF THE MINERAL POINT ZINC CO.

Zinc Co. Works at Depue, Ill.



SULPHURIC-ACID PLANT OF THE MINERAL POINT ZINC CO.

A SUBSIDIARY OF THE NEW JERSEY ZINC CO., AT DEPUE, ILL.

Chronology of Mining for November

Nov. 3—Announced that a special mining regiment known as the 27th Engineers would be raised by voluntary enlistment.

Nov. 5—I. W. W. headquarters raided in Tulsa, Okla., oil fields and nine members arrested, subsequent to the dynamiting of the home of J. Edgar Pew, general manager of Carter Oil Co.—Maximum prices approved by the President for cold-rolled steel, wire, tin plate, pipe, sheets and scrap, as agreed upon by War Industries Board and steel producers—Embargo at two Murray sampling mills of Utah Ore Sampling Co. lifted.

Nov. 6—National Fuel Administrator H. A. Garfield issued order requisitioning 10% of output of every coal mine in United States.

Nov. 8—Seventeen I. W. W. members flogged, tarred and feathered in Tulsa, Okla., by a band of masked men.

Nov. 12—Osage Indian Oil leases covering area of 20,000 acres sold.

Nov. 15—Law regulating manufacture, sale, storage and use of explosives became effective, F. S. Peabody being appointed to take charge of its enforcement.—Report that United States Government is arranging with silver producers of this country for purchase of 100,000,000 oz. at price around 85 cents.

Nov. 17—Oliver Iron Mining Co. announced that part of town of Hibbing, Minn., will be removed to facilitate mining of underlying orebody.

Nov. 18—The Mexican government during this week prohibited any new denouncements of mining claims.

Nov. 20—In Butler County oil fields of Kansas, 50 I. W. W. workers were arrested in connection with labor troubles.

Nov. 25—Mexican decree issued establishing damage claim bureaus to adjust claims arising during the revolution.

Nov. 26—U. S. Government attaches all tin assaying over 99.75% stored in warehouses.

Nov. 28—President Wilson proclaimed sundry imports, including many metals and ores, subject to license.

Nov. 30—Price of tin at New York jumped to 88c. per lb.—President's Mediation Commission during this week announced an agreement between operators and miners in Jerome district similar to one made in Globe-Miami and other Arizona districts

Ontario Metalliferous Production

The Bureau of Mines of Ontario furnishes the following statistics regarding the production of the metalliferous mines and works of Ontario for the nine months ended Sept. 30, 1917. For purposes of comparison, figures for the corresponding period of 1916 are also given. Notwithstanding the falling off in the output of gold, silver and copper, the aggregate value for the nine months was, according to the report, about $2,000,000 more than for the same period in 1916. High prices for silver, copper and nickel are largely responsible for this increase.

The gold output for the first nine months of the year was about 20,000 oz. less than for the corresponding period of 1916. Of the total production, the Hollinger mine yielded 161,702 oz.; McIntyre, 59,779 oz., and Dome, 58,978 oz. Gold, having a fixed price, was the only metal which did not share in the general advance. The high costs of labor and supplies have, for the time being, lowered the rate of expansion for this branch of the industry.

Shipments of silver from various important mines were as follows: Mining Corporation of Canada, 3,831,211 oz.; Nipissing, 2,839,462 oz.; Kerr Lake, 1,708,921 oz.; Coniagas, 976,315 oz.; O'Brien, 925,000 oz.; McKinley-Darragh-Savage, 775,566 oz.; Miller Lake-O'Brien, 757,132 ounces.

Production of nickel and copper shows that the nickel contents of the mattes for the nine months of 1917 were a little larger than for the same period in 1916, but the copper contents were about 1000 tons less. The International Nickel Co.'s new refinery at Port Colborne is well under way, and is expected to be turning out refined nickel before next spring. The mines of Sudbury are now, and have been for some time, working at maximum capacity.

SUMMARY OF ONTARIO METALLIFEROUS PRODUCTION, FIRST NINE MONTHS OF 1917

Product	Quantity 1916	1917
Gold, oz	363,955	343,490
Silver, oz	16,203,091	15,236,002
Cobalt (metallic), lb	172,055	295,866
Nickel (metallic), lb	17,435	166,921
Nickel oxide, lb	54,152	10,831
Cobalt oxide, lb	378,732	276,769
Other cobalt and nickel compounds, lb	57,026	276,217
Molybdenite, lb	15,845	65,827
Copper ore, tons	1,715	2,658
Nickel in matte, tons	31,046	31,064
Copper in matte, tons	16,989	15,928
Ire ore (exported), tons	*	98,757
Pig iron from domestic ore, tons	*	48,820
Lead, tons	*	540

* 1916 figures are not available.

The iron ore and pig iron statistics show that, in addition to ore exported, 138,808 tons were shipped to Ontario smelters. Of the total of 983,321 tons of ore smelted, only 93,536 tons, or 9.5%, was Ontario ore. The total pig iron produced was 513,232 tons, as compared with 501,410 tons for the corresponding period of last year.

Foreign Trade in Copper

Exports of copper from the United States in August, September, 1917, and the first nine months of the year, are reported by the Department of Commerce to be as follows:

	Aug. Lb.	Sept. Lb.	Jan.-Sept. Lb.
Ore and concentrates, contents	351,420	444,684	4,300,492
Unrefined, in bars, pigs, etc		2,017,838	6,164,637
Refined, bars, etc	95,733,812	60,601,803	789,430,395
Old and scrap	29,752	4,347	889,734
Plates and sheets	1,642,529	2,817,476	23,935,037
Pipes and tubes	2,289,320	570,999	*5,642,574
Wire, except insulated	1,425,638	667,310	18,998,550
Composition metal, copper chief value	8,400	1,179,589	*1,187,996
Total	101,480,871	68,304,046	850,549,415

* Figures cover period beginning July 1.

The weight of ore exported in September was 4472 long tons, and of concentrates, matte and regulus, 283 long tons.

Imports of copper in August, September and the first nine months of 1917 were as follows:

	Aug. Lb.	Sept. Lb.	Jan.-Sept. Lb.
Ore and concentrates, contents	11,814,430	13,279,521	111,647,770
Matte and regulus, etc	1,632,918	3,613,346	16,504,106
Unrefined, in bars, pigs, etc	34,546,504	21,409,698	271,163,555
Refined, in bars, etc	1,395,268	620,752	6,025,620
Old, etc., for remanufacture	464,068	752,254	16,016,099
Composition metal, copper chief value	161,376	13,997	367,072
Total	50,014,564	39,689,568	421,724,222

Ore imported in September weighed 36,222 long tons; concentrates, 12,976; matte and regulus, 2631 long tons.

Correspondence and Discussion

Is Gold Mining Necessary During the War?

I understand that there is a movement afoot to ask Government officials and Congress to adjust the war tax so as to stimulate gold production in the United States. I ask, Is this action wise? Do we really need to produce gold to help win the war? Is it not coal, iron, copper, lead, spelter, and possibly silver, that we need? Is it not better that our gold miners, for the duration of the war at least, engage in mining those things that we really need?

I observe that the president of the Dome Mines, Ltd., has issued a notice to the stockholders and the public stating that, on account of the high cost of supplies and the difficulty of securing labor, their mines will cease production for the present.

It may be quoted in objection to my point that Great Britain is doing all she can to stimulate gold production in the Rand. I am quite willing to admit the sentimental or even the commercial value of increasing the gold reserves of Great Britain, but I doubt if she would encourage the production of that metal in Great Britain itself. It is very different in South Africa where there is an organization engaged in producing gold which has no other industry upon which it can fall back, but in the United States and Canada it does not seem to me that these conditions exist. J. PARKE CHANNING.

New York, Dec. 3, 1917.

Folly of Temporizing with the Saloon Propaganda

The article entitled "Some Observations on Arizona Strikes," by Charles F. Willis, which appeared in the *Journal* of Oct. 13, seems to be the first direct discussion appearing in this magazine of what the working classes consider the big problem of the time, and the one to be fought out as soon as the present squabbling of nation against nation is over. Remarks about the usefulness of the saloon inspire me to state how the question appeals to one who has worked among the miners as a miner in most of the principal mining camps of the continent, and has given particular thought to the cause and remedy of the unrest among the wage-earning classes.

ENVY THE ROOT OF SOCIAL DISCONTENT

Fundamentally this discontent is based on that conspicuous trait of human nature, envy. We resent seeing another person have what we would like to have. We see him sail by in his automobile, and cannot understand why he should have one and we not. We miners resent that the college graduate, fresh from school, so readily passes the practical miner, and that as opportunities to the college man for advancement increase those for the miner decrease. We cannot see how the man with the fine home or the auto got these things, and we feel sure that all the learning acquired by the college man at school is not really as valuable as our years of practical experience. We only know that we are down and cannot seem to get up.

In past generations children were told that it was proper for the king to have all his pomp and accommodation, because he was king. It was natural to feel that this was proper and even to feel a pride in him, much the same as we now feel a pride in our splendid public buildings. The landlord should ride in a coach because he was rich, or the official should be decked out and ride because of his position. They felt no resentment because the class to which they belonged had its limitations. There was no class preaching that these more fortunate ones derived their superiority from the sweat of our brows, or if such thoughts were expressed we were educated to think otherwise. If some of the present generation were old-fashioned enough to attend Sunday school, we were probably taught that envy was a sort of sin—or at least we learned something of the folly of letting it breed hate against those more fortunate. At present it is more likely that children hear their parents preach the injustice of existing economic conditions, so that their first idea is that the social arrangement of today is all wrong. In recent years, particularly, we have been told from street corners and in saloons that the rich gained their wealth by dishonest means, that wealth is an indication of theft, and that the poor laboring man has been robbed to feed the stockholder of the rich corporations.

EVIL RESULTS OF APPEALS TO CLASS HATRED

Why this recent increase of unrest among hired labor? Beginning about 1906 and 1907 (thanks to the wave of prosperity that swept the country at that time) a few magazine writers found it immensely profitable to exploit a field of literature which had not been overworked and to write most appealing and sensational tales of the poor laboring class being downtrodden by the powerful and rich classes above. Many daily papers were quick to realize that the subject appealed to the mass of the people. There was enough truth mixed with the chaff to attract the average person, and the ranker the chaff the greater its influence upon some elements. Then there are politicians always seeking to gain votes by class propaganda and at this particular time it seemed as if every type of politician or representative of the people had enlisted in the trust-busting escapade.

It is the nature of many, especially among the more ignorant, to wish to be convinced that those things are true which they would be pleased to have true, but which their own minds realize are not so. The weight of statements from other persons finally breaks down their personal judgement, and they chronically force themselves to believe what they do not want to hear refuted. Modern socialistic propaganda—pleasing to this type of mind, conceived and promoted by those who

know better, and persisted in because of the advantage in it to themselves—is the root of the present unrest.

Many of the malcontents do not read the current newspapers at all and those who do not receive this balancing influence are the most prejudiced and unwilling to take any other view than that capital is the cause of all suffering and poverty. How have they reached this state of mind? It has surprised me to find so many miners who appear intelligent, good workers, and apparently reasonable in most things, display such a lack of reason when it comes to questions of social economics or politics that it would seem impossible to believe that such ignorance and prejudice could exist. The condition shows that any propaganda can convince the masses if persisted in and not neutralized by corrective educational influences.

There are probably more politics and economics taught in the saloon than anywhere else, and it is all of the false, socialistic sort. The saloon-keeper preaches the doctrine that "the dollar is round and made to go around." Therefore, spend your money, boys; and if the cursed capitalist were only made to do the same, how much happier we should all be! The more men it takes to do a job, the more jobs for all the boys and the more drinks to be bought every evening. Thus the feeling has been created that it is treason to his class for a workman to do more than the least possible.

It is in the saloons that public questions are discussed most often by the workingman, and frequently elections are thus won or lost. Here reason is at the minimum but minds are receptive, especially to the popular clamor that all should share wealth equally, and not allow the fellows who never come out among the boys to get it all. The saloons take up the dirty work which the periodicals began and the cheap politician is carrying on, each spreading lies for its own gain or patronage. Many men, lacking sufficient reason to discriminate, often become loyal followers, their hatred for the upper classes and their general discontent becoming a part of their nature. So long as some people, smarter than those they are working on, can benefit themselves by spreading hate, falsehoods and dissatisfaction, one must expect growing unrest unless this influence is balanced by education along opposing lines.

Proper Educational Work Indispensable

If these are the causes, what is the remedy? Education is the only remedy. First the periodicals must run dry. People must become immune to the incessant hammering about the hardships of the "poor abused laboring man." The papers should take up other themes and should explain the real causes of poverty and failure, the high cost of living, etc., which it has been so popular to lay to the "trusts."

It is hard for enlightened persons to understand how it is possible to deceive so many of the people all of the time or practically all the people so much of the time; how questionable publications or dishonest propaganda can make headway against the obvious truth; for we are not permitted to observe the method by which public sentiment often is molded for some one's personal gain. We feel immune from that sort of influence, yet none of us is wholly free from it, susceptibility being in ratio to understanding and reasoning power.

Men need to get out among other men, not only of their own stamp, but of other classes who may look at matters from different viewpoints. Here is the good and the bad of the saloon. Men get together and exchange ideas in the saloon, but, after all, they are all of a type. Only one class patronizes these resorts to any extent. Here mental attitudes of the most vicious sorts are cultivated and minds are filled with false impressions. The saloon may be a temporary relief to the troubled mind, but it is the breeder of chronic disease. To close the saloon will not change the mental attitude of the old patrons who spent evening after evening telling how the big, brutal company was getting rich out of the sweat of their brows, but it will stop the poisoning of new minds. Young men growing up will have a chance to see things as they are. Their ambition will not be sapped by drunkenness. Their time and money will be spent in less demoralizing recreations. If not baseball or other athletics, there is the bicycle, the motor-cycle and the automobile.

Many Substitutes for the Saloon

Mr. Willis is afraid there can be no substitute for the saloon. To feel that this is the best place the miner can enjoy his evenings, simply because this is the way he has been spending them, is to shut one's eyes to all the possibilities open to him. There is the home, with books and magazines; social association with his neighbors; the club; the church; the soft-drink and ice-cream parlor; the movie show; the community house; athletic attractions; the garden, or a little travel. If a man is married the home deserves about all the spare time he has. If he is not married and has no motor-cycle or automobile or other affinity, there are generally as many unmarried females looking for men as there are men looking for female companionship. Only degenerate specimens of humanity need become dependent on the saloon, and it is not worth while to poison the whole for the sake of allowing these to continue in their favorite element.

In the opinion of one who has studied the miners from first hand for the last 10 years the yellow journal, the saloon, and the cheap politician are the causes of the present unrest. The removal of one or two of these conditions will gradually bring about a more healthy state, as new generations take the places of the elements now infused with the more rabid socialistic notions. The better-educated class should do something to counterbalance the effect of self-seeking agitators.

A Technical Miner.

Hibernia, N. J., Nov. 15, 1917.

Engineer Artillerymen

I would like to call attention to two exceptionally comprehensive books on field artillery drill and fire practice that are available either by purchase or from the Carnegie libraries. Any engineer who is not subject to draft but who may be before the war is over can put in his spare time studying these books to advantage and with interest. The books are of 1917 publication and up to date. They are "Drill and Service Regulations for Field Artillery" by the Chief of Staff, published by the Military Publishing Co., 42 Broadway, New York; and "Field Artillery Detail," by Moretti and Danford, published by the Yale University Press.

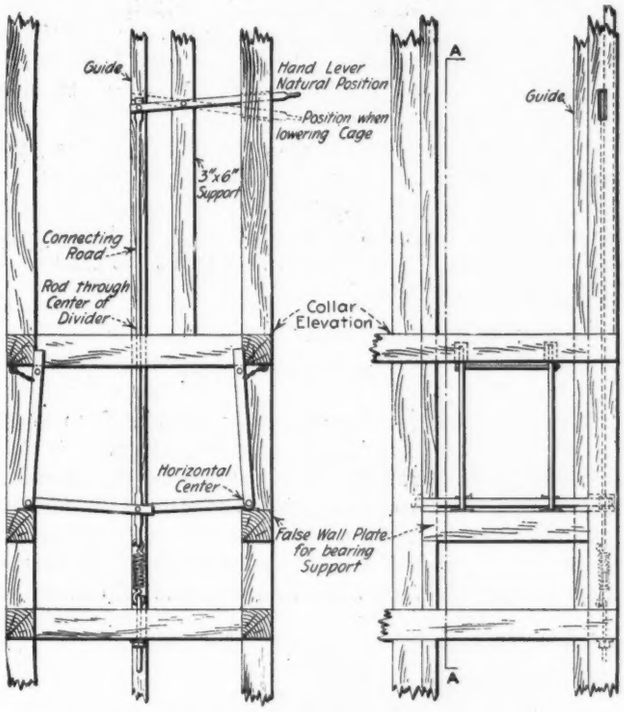
New York, Dec. 4, 1917. H. W. Kitson.

Details of Practical Mining

Cage Chairs for Shaft Landings

By W. F. Fancy*

In a development which had to be carried on through winzes, owing to the nature of the formation, because there was not enough hoisting to warrant a cage tender the chairs shown in the illustration were designed primarily for the collar of the winze. The arrangement indicated calls for a spring bolted to one of the wall plates below the collar set. This spring is under constant tension and is fastened to a connecting rod, which is bolted to the operating lever at the landing



CAGE CHAIRS FOR SHAFT COLLAR

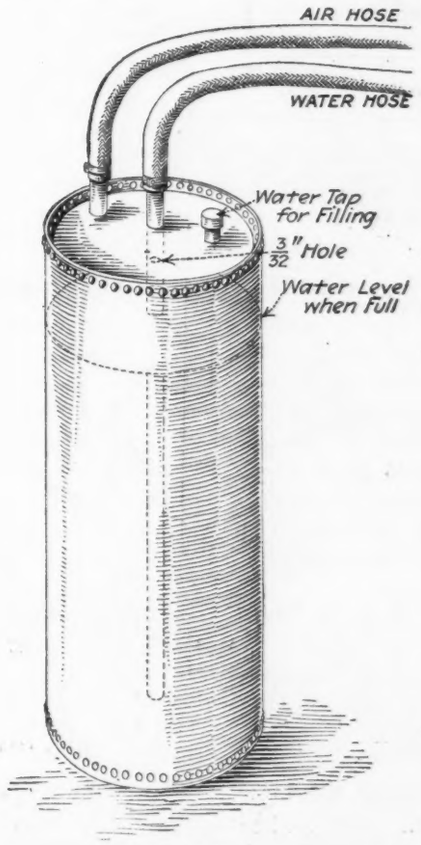
station. The chairs proper consist of two pairs of supporting arms, each pair keyed to a shaft which is linked to the connecting-rod. When the cage is resting on the chairs, the entire weight is taken by the four supporting arms, which, in turn, are supported by iron plates resting on false wall-plates so that the remainder of the mechanism is released from all unnecessary strain. With the operating lever in its natural position, the tension of the spring throws the connecting-rod down and forces the chairs "out" into the shaft. When the cage is hoisted, it will pass through the chairs, but on lowering, the chairs will have to be thrown "in" from the shaft before the cage can be lowered beyond the collar. This latter operation is performed by pushing down the lever.

*Mine Captain, Lake Mine, Cobalt, Ont.

These chairs have been in use at the Lake mine, Ontario, for months and are giving excellent satisfaction. By means of a cable leading from the lever over a small sheave to the hoist room, the hoistman can withdraw the chairs from the shaft when necessary. While this method has not been tried out on intermediate levels, it should be simple to reverse the spring and produce an opposite action of the chairs which would keep them "in" instead of "out."

An Improved Water Tank for Machine Drills

The common form of tank for supplying water to machine drills may be improved by a simple alteration that makes the water supply to the drill hole more effective in blowing out the sludge. In ordinary operation when the tank is filled with water and the drill running the air pressure in the tank forces the water



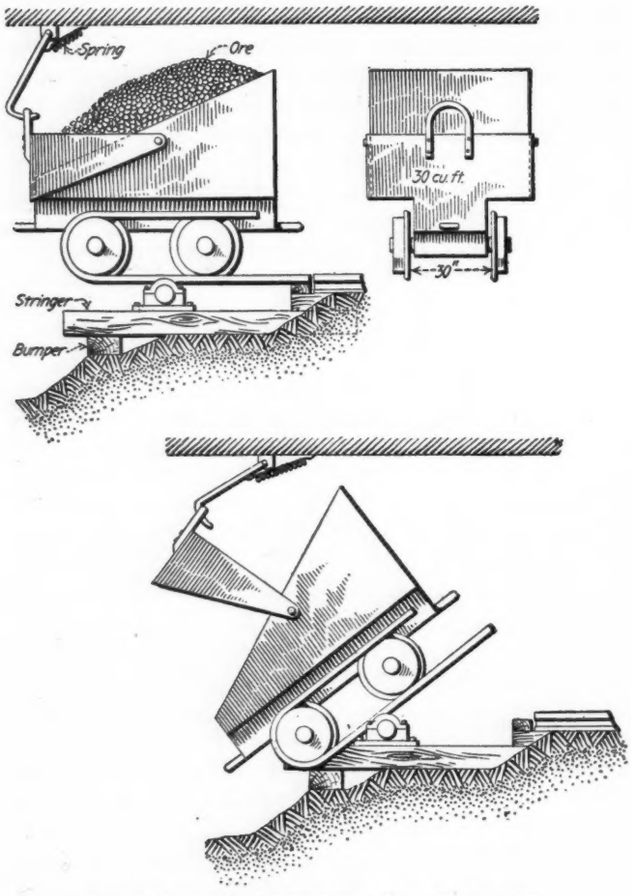
WATER TANK FOR MACHINE DRILLS

through the water hose to the drill and into the drill hole. While the water is effective in allaying dust and will wash out holes in hard ground which point upward, the pressure is not strong enough to clean downward-pointing holes, or holes in ground that makes a sticky sludge. To remedy this, a simple change was made,

which works satisfactorily and is shown in the accompanying illustration. A $\frac{3}{32}$-in. hole was drilled in the water-feed pipe above the highest water-level, so that as the air pressure is applied to the tank, bubbles of air enter the water as it passes through the pipe to the drill. These bubbles of air burst when they reach the bottom of the drill hole and the mixture of air and water is more effective in throwing the sludge out of the hole than the water alone. The hole in the water pipe must be small in order not to admit too much air, which would reduce the pressure on the water.

Two-Ton Car and Tipple

A car of unusual shape is used with a tipple at one of the mines in the Southeast Missouri disseminated-lead district, where the cars are loaded in the stopes by Myers-Whaley underground electric shoveling machines and trammed by mule to a storage pocket. The cars are heap-loaded to maximum capacity, hold from 1½ to 2 tons of crude ore, and are equipped with Whitney

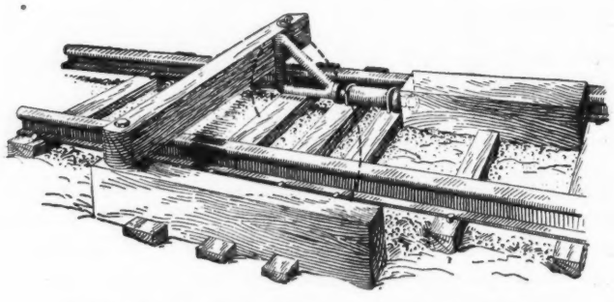


SELF-DUMPING TIPPLE AND MINE CAR

Wonder roller bearings. Track is 30-in. gage, with 30-lb. rail. The car-box bottom is set rigidly to the journals, the wheels being sunk into shoulders at the sides of the car bottom in order to gain greater capacity. The sides of the car are in the shape of a right-angle triangle, as shown in the accompanying sketch. At about the center of the hypothenuse a gate with triangular sides is hinged, which, when closed, forms the front and sides of the head end of the car. A large round-iron loop or yoke is riveted to the top of the car gate, the purpose of which is to engage a hook suspended from an eyebolt in the roof above the tipple. The tipple consists of two U-shaped flat iron bars rounded to engage both wheels on each side of the car and is pivoted directly below the rail bar by an axle set in journal boxes resting on stringers. The lower end of the U forming the track of the tipple is made sufficiently long to preserve a normal position with respect to the track when empty and rests upon a tie at the extremity of the car track. The cars are run into the tipple at a fair rate of speed, the mule stepping to one side after being unhitched and the car being braked by means of a sprag. As the loaded cars enter the tipple the gate loop passes over the hook and the center of gravity of the car moves beyond the axle of the tipple, causing it to overbalance with the car, thereby raising the gate and discharging the contents into the pocket. The angle of dump is governed by a bumper timber set below the outer end of the tipple at the required distance. The discharged car and tipple remain in the position of dumping until righted by hitching the mule to the rear-end coupling and drawing the car and tipple back to a normal position. The suspended hook is returned to its normal position by a coil spring attached to it by a clamp and to the roof by an eyebolt. The spring prevents the hook from slipping out of the gate yoke while dumping. Cars are dumped in this manner with considerable rapidity and have the advantage of a large capacity for the weight of the car, its track gage and the amount of head-room available at the discharge belt of the power shovel

Safety Car Stop

A car stop that has been found convenient for use on steep grades in the Alberta district, Canada, is described by M. Cranston in *Coal Age*. Occasionally loaded cars will bump against the stop, and on certain types of stops when the trip does this it is necessary to push them back again, in order to secure sufficient room to open the stop block and pass the trip over the



CAR STOP FOR USE ON HEAVY GRADES

knuckle. With the stop shown in the illustration, this labor is avoided, since by simply turning the bar to the right and pulling the block over by the ring, clear of the rail, the trip is released.

The stop is made of 1½-in. steel bar working in a sleeve secured to the ties. A bolt is fastened in the block near the ring to prevent the bar going over too far. This safety stop is quite simple in construction and can be made from material that could not be utilized for any special work.

Events and Economics of the War

Immediate war upon Austria was asked by the President in his message to Congress which reopened at noon on Dec. 3. The budget for the fiscal year 1919 was presented by Secretary McAdoo to both Houses upon reassembling and is estimated at 13½ billions. The stamp and parcels-post taxes imposed by the War-Revenue Act became effective Dec. 1. By order of the President, the importation of many articles will hereafter be subject to license. In an effort to ease the coal situation, producers throughout the country have been asked by the Fuel Administrator to give priority to orders for coal for plants doing Government and other essential work; the price of anthracite has been advanced 35c. per ton by the President. The railroad brotherhoods and railway telegraphers have made specific demands on the roads for wage-increases, the former requesting an answer by the end of December.

In France, a German counter-attack south of Cambrai regained a small part of the ground lost, the British forces retiring from Masnieres. Berlin claims 4000 captured in the operation. The Allied war council held in Paris has concluded its deliberations. The Italians stand fast on the Piave, but a greater Teuton offensive is expected. The Bolsheviki have met with partial success in their endeavors to bring about an armistice on the Russian front, and have published what is alleged to be Italy's treaty with the Allies, giving the terms upon which she entered the war.

Stamp Taxes of War-Revenue Act Now Operative

The new stamp taxes imposed by the War-Revenue Act, including those on parcel-post packages, became effective on Dec. 1. The documents affected by the new taxes are as follows: Bonds of indebtedness, debentures, or certificates of indebtedness; bonds of indemnity and surety; capital stock issues; capital stock sales or transfers; produce sales on exchanges or boards of trade; drafts or checks payable otherwise than at sight or on demand; promissory notes; conveyances, deeds, instruments conveying lands, tenements, or other realty; entry of goods at Custom House; entry for withdrawal of goods from Customs bonded warehouse; passage tickets; proxies; and powers of attorney. Parcel-post packages on which the postage amounts to 25c. or more are subject to a tax.

The new documentary stamps may be purchased from the Collectors of Revenue of the various districts, and in due time will be on sale at post offices and at the various banks designated as United States depositaries.

Proper cancellation of a stamp is thus described: Whenever an adhesive stamp is used for denoting any tax, the person using or affixing same shall write or stamp, or cause to be written or stamped thereupon, the initials of his or its name, and the date upon which the stamp is attached or used. If the stamp is of the value of 10c. or over, three parallel incisions with a sharp instrument should also be made lengthwise so that the stamp may not again be used. Proper perforations are permissible in lieu of the incisions mentioned. The penalty provided for violation of the law is a fine of not less than $100 for each offence.

The War-Revenue Act was approved by the President on Oct. 3. Some of the taxes provided for, including those on hard and soft drinks, incomes and excess profits, have been in effect since that date. Many others directly touching the majority of persons became effective on Nov. 1 and postage rates on letters and cards were advanced on Nov. 2 pursuant to the law. Except for the increased rates on second-class mail, postponed until July 1 next, the entire act is now in operation. Samuel Untermyer, of New York; John Barton Payne, of Chicago, and A. A. Ballantine, of Boston, have been appointed legal advisers to the Commissioner of Internal Revenue in connection with the War-Revenue Act. They will serve without compensation.

Industrial Unrest in Great Britain

The report of the British Commission of Inquiry into Industrial Unrest, which has been reproduced in a bulletin of the U. S. Department of Labor, emphasizes as the leading cause of discontent the fact that the cost of living has increased disproportionately to the advance in wages and that food distribution is unequal. Another cause regarded as particularly serious is the restriction of personal freedom under the Munitions of War Acts, by which workmen have been tied up to particular factories and have been unable to obtain wages in proportion to their skill; in many cases the skilled man's wages were less than those of the unskilled. The requirement of leaving certificates was reported as one of the chief causes of dissatisfaction, but this restriction has been abolished by an order of the Minister of Munitions, and any munitions worker may now leave his present employment for other war work by giving a week's notice, or such longer notice as is provided for in his existing contract of service.

Dilution of labor and lack of confidence in the government growing out of the surrender of trade-union customs and the fear that promises regarding the restoration of pre-war conditions will not be kept, are given special attention. It is stated that the irritation caused by the withdrawal of the trade-card scheme under the Military Service Acts has subsided, but there remains much anxiety regarding the working of the schedule of protected occupations. All the reports refer to the lack of coördination between government departments in dealing with labor, and considerable complaint on account of the delay in dealing with disputes and the difficulty of securing prompt awards is reported.

Other causes of unrest, such as inadequate housing, liquor restrictions, and industrial fatigue, are mentioned as acute in some districts. Mention is also made

of lack of proper organization among the unions, inconsiderate treatment of women as regards wages, delay in granting pensions to soldiers, and inadequacy of compensation under the Workmen's Compensation Act.

The Commissioners recommend that there should be an immediate reduction in food prices, the increased cost of food to be borne to some extent by the government, and that there should be a better system of distribution. The necessity of reducing hours, readjusting wages to a fairer basis for skilled as against unskilled workmen, the fuller use of trade-union machinery, and renewal by the government of the declaration that trade-union rights and privileges which have been interfered with on account of the war shall be restored after the war, are insisted upon. The establishment of industrial councils for each of the organized trades is strongly urged, such councils to be composed equally of employers and employees. Regarding the settlement of disputes, various suggestions are offered, to the effect that one central authority should be constituted, that local arbitration tribunals should be formed, that local commissioners with technical knowledge to settle disputes should be appointed, and that workshop committees should be established. It is also recommended that when an agreement is drawn up between representatives of employers' federations and trade-unions it should be binding on all in the trade concerned.

Embargo Placed on Imports

By proclamation of the President on Nov. 28 an embargo was placed on the import of many articles into the United States except under license granted by the War Trade Board. Among the number are included the following:

Antimony, antimony ore, or any chemical extracted therefrom; asbestos, balata, chrome, chrome ore, or any ferroalloy or chemical extracted therefrom; cobalt, cobalt ore, or any ferroalloy or chemical extracted therefrom; industrial diamonds, all ferroalloys, gutta joolatong, gutta percha, gutta siak, iridium, manganese, manganese ore, or any ferroalloy or chemical extracted therefrom; mica, molybdenum, molybdenum ore, or any ferroalloy or chemical extracted therefrom; naxos emery and naxos emery ore, nickel, nickel ore, matte, or any ferroalloy or chemical extracted therefrom; sodium, potassium, or calcium nitrates, eptical glass, platinum, plumbago, pyrites, rubber, raw, reclaimed, waste or scrap; scheelite, spiegeleisen, tin in bars, blocks, pigs, or grain, or granulated; tin ore and tin concentrates, or any chemical extracted therefrom; titanium, titanium ore, or any ferroalloy or chemical extracted therefrom; tungsten, tungsten ore, or any ferroalloy or chemical extracted therefrom; vanadium, vanadium ore, or any ferroalloy or chemical extracted therefrom; and wolframite.

Priority Asked for Coal Needed for Essential Industries

Requests have been sent out by the U. S. Fuel Administration to 5000 operators representing virtually all of the coal production of the country, except that of the Rocky Mountain region, asking them to give preference for 30 days on all shipments for Government account, railway fuel, domestic requirements, public utilities, munition plants, steel plants, byproduct coke ovens and tidewater shipments to New England. This in effect is a curtailment of coal shipments to the less essential industries, says the *Sun*. The filling of contracts will begin with the industries named. The others will have to wait until the war needs are satisfied, if the request of the Fuel Administrator is honored. In some cases it is possible that the coal operators in acceding to Dr. Garfield's request will fail to fulfill some of their contracts to the industries not included in the preferential list. They will be safeguarded against liability, however, since their action will be at the instance of a Government agency.

Eastern Railroads Pool Tracks and Equipment

The committee appointed by the Railroads' War Board to put into operation the plan to pool tracks and equipment of Eastern railroads for the period of the war took radical action to facilitate transportation at its first meeting on Nov. 28, according to the *Times*.

Orders were issued affecting the various railroads operating in the territory east of the Mississippi and north and south of the Ohio and Potomac Rivers as follows:

To embargo immediately the shipment of all export steel billets, bars, plates, scrap and pig iron, except that intended for the use abroad of the U. S. Government.

To divert all through freight which would normally pass through the congested Pittsburgh gateway between the East and the West to the railroads north and south of that district.

To discontinue the Pennsylvania's fast New York-Chicago train, the Broadway Limited, effective Dec. 1.

To suspend immediately the running of fast freight lines.

To furnish only box and stock cars for team track loading of coal.

Denial that the proposed plan of operation contemplated a pooling either of traffic or earnings was made by Fairfax Harrison, chairman of the Railroads' War Board, who explained that what the roads are attempting to do is not a violation of the Interstate Commerce Law inasmuch as it is only a partial pool of their physical facilities.

"We have merely arranged for the use of physical facilities in common at places and to the extent necessary to enlarge sufficiently the capacity of the Eastern railways," said Mr. Harrison. "If the word 'pool' is applicable, what we have partially pooled are the physical facilities."

Effect of the War on Manufacturing

The effect of three years of war upon the manufacturing industries of the United States can now be measured, in some degree at least, by official data which render possible comparison of conditions in 1917 with those of 1914. An analysis by the National City Bank of New York of figures of export of manufactures compared with those of 1914 indicates a wonderful development in the exports and evidently a large growth in the manufacturing industries of the country in that short period. Manufactures exported in the first nine months of 1917, for which figures are now available, are more than four times as great in value as in the same months of 1914. Finished manufactures ready for consumption exported in the nine months ended September, 1917, amount to $2,063,000,000, against $466,000,000 for the same months of 1914. Manufactures for use in manufacturing are $957,000,000, against $262,000,000 in the corresponding months of 1914. Thus the total of manufactures exported in the first nine months of 1917 is $3,020,000,000, against $728,000,000 for the corresponding 1914 period.

While this large increase occurs, to a considerable extent, in strictly war material, it also applies to a large proportion of the classes of goods produced by our manufacturers. No official census of manufactures in the United States has been taken since 1914, but the large increase in production is illustrated not only by the increased imports of manufacturing material and increased exports of manufactures, but also by the fact that the quantity of pig iron produced in the country in the eight months ended with August, 1917, was 25,660,000 tons, against 16,355,000 tons for the same months of 1914, and that the quantity of cotton used by the factories of the United States has increased approximately 25% in the same period indicates that the actual quantity of manufactures turned out has enormously increased, while the advance in prices has still further increased the total value of the output as compared with the pre-war period.

Navy Releases Seized Tin

Protests of canners against the recent act of the Navy Department in commandeering all tin in New York warehouses have been met with promises that the tin would be released. The canners were backed by the Department of Commerce, which maintained that essential industries would be handicapped seriously by lack of the metal, particularly food-canning factories.

The American Iron and Steel Institute, designated by the War Trade Board as consignee of all imported tin, will endeavor to obtain another supply for the Navy's needs, and in future the Navy will look to an institute sub-committee for tin needed in naval construction. It was said this agreement would put the tin supply of the entire country under centralized control, thereby assuring allotments to Government departments and private individuals on an equitable basis. Further easing in the visible supply of the metal is expected to result soon from cable negotiations now being carried on by the Department of Commerce with London, seeking the release of approximately 3500 tons of tin purchased by American firms, but which had been held up by the British committee regulating exports of the metal.

Put Electric Roads on War Footing

The American Electric Railway Association has announced the creation of a war board to operate the electric railways of the country, especially suburban and interurban lines, during the war in coöperation with the steam roads. The Railroads' War Board, in charge of the war operation of the steam lines, has suggested that the electric lines can do much good in supplementing the transportation service of the steam lines by extending their freight hauling, especially in the carrying of food from farms to cities.

The steam roads have also announced an approaching material further curtailment of passenger trains, and it is the intention of the electric railways to replace the service of curtailed local trains. The steam roads have supplied the Government with a list of some 400 or 500 nonessential commodities for embargo, and the electric lines believe they will be able to handle some of this business.

There are 41,000 miles of electric railway in the United States, of which 16,000 is interurban. It is this latter of which the greatest use will be made in increasing the transportation facilities of the Government. It is the purpose of the managers of the electric roads to arrange with the steam roads a system of interchange of traffic, and it is understood that the steam roads are ready and willing to enter into such an agreement. C. Loomis Allen, ex-president of the American Electric Railway Association, has been named director of the association's war board.

Must Not Handicap American Vessels

"The removal of all inequalities and injustices from the American navigation system, enabling American shipping to maintain itself upon an equitably competitive basis with other nations, with due regard to American standards of living and compensation, is absolutely essential to the permanency of the forthcoming rehabilitation of the American merchant marine," asserts the National Foreign Trade Council in a resolution submitted to the U. S. Shipping Board. Accompanying the resolution is a report prepared by the council's committee on merchant marine, and signed by James A. Farrell, chairman of the council, and president of the United States Steel Corporation, and P. A. S. Franklin, president of the International Mercantile Marine Co. Edward N. Hurley, chairman of the Shipping Board, is a member of the council.

The report calls attention to the fact that six months after the proclamation of peace the emergency powers delegated to the President end, and that five years after the end of the war all operation of merchant vessels by the Emergency Fleet Corporation must cease. Thereafter the Shipping Board "may sell, lease, or charter" Government vessels to private citizens, and must not undertake their operation through Government agencies until after a bona fide effort to secure their operation through private enterprise has failed. The report continues:

"The question, when peace comes, will be of operation rather than of provision of more ships. The shipbuilding industry of the country, enormously stimulated by war conditions, will face curtailment rather than further expansion. The huge development for construction of wooden ships, made possible only by war and the ravages of the submarines, must be almost wholly abandoned or reorganized for other services."

Price of Anthracite Advanced

A general increase of 35c. a ton was added to the price of anthracite at the mines on Dec. 1 by President Wilson to meet a proposed wage increase for anthracite miners. The new prices were effective immediately. The wage increase was agreed on by operators' and miners' representatives in Washington three weeks ago, contingent on higher coal prices to absorb the raise. When their negotiations were ended the operators and miners turned over to the Fuel Administration their agreement and estimates of what it would add to the cost of production. They asked that prices be raised at least 45c. a ton. Dr. Garfield stated, in recommending the advance to the President, that he expected it would be possible to order, April 1, 1918, the customary reduction in anthracite prices.

Industrial News from Washington

By Paul Wooton, Special Correspondent

Work at the Experiment Stations of U. S. Bureau of Mines

Experiments have been started at the Salt Lake City station of the U. S. Bureau of Mines on the flotation of certain oxidized minerals which so far have not been successfully floated and recovered from their ores. The tests on chloride volatilization of lead and other low-grade ores that are being made on a large scale are reported to be progressing satisfactorily. No difficulty has been found in volatilizing lead, copper and gold, but to obtain similar results with silver and zinc has been found to be an entirely different matter.

Crushing machinery and other equipment have been installed at the Moscow station, in Idaho, for conducting tests. At present, experiments are being made on Cœur d'Alêne ores. The Tucson, Arizona, station has obtained satisfactory results in the employment of hot sulphuric-acid gases as a solvent for oxidized and siliceous ores. Tests of this nature have been made on ores and mill products of the Ray Consolidated Copper Co. The experiment station at Fairbanks, Alaska, will be completed much earlier than was expected. The general office and offices of members of the staff have just been occupied. An extensive mineral exhibit has been opened. The Seattle station has received a shipment of tin ore from the Black Hills for ore-dressing tests.

Official Ruling Diverts Technical Men from Their Proper Field

Despite efforts that have been made to keep scientifically trained men from going to the front, it is apparently the fixed policy of the War Department not to allow their exemption. While some men with such training have been returned for special work, the number is not large when compared with that now with the colors. The War Department declines to allow even the scientific branches of the Government service to specify the man or men they wish for war work. In case an explosives expert is wanted, for instance, the War Department will detach a man from his regular unit and assign him to the bureau in need. Usually a person so detached does not meet the requirements. Until permission is granted, therefore, to specify by name an individual whose qualifications are known, those in charge of the Government's scientific war work must draw their men from those above military age.

The most recent expression of authoritative opinion on this subject is a letter sent last week by the Secretary of War to Dr. Hollis Godfrey, of the Advisory Committee of the Council of National Defense. In this letter Mr. Baker said:

> The successful outcome of the war is so dependent upon the applications of science that the United States can ill-afford at this time to risk any diminution of this supply of technically trained men. Such diminution we must in part suffer by reason of the fact that class exemptions in the execution of the Selective Service Law are prejudicial to its general success; but I have constantly in mind the fact that the Government service will demand more and more scientifically trained men, and so I hope those who are in charge of scientific institutions will impress upon the young men the importance and desirability of their continuing their studies except to the extent that they are necessarily interrupted by a mandatory call under the provisions of the Selective Conscription Law.

On Dec. 15 another ruling goes into effect that will make it still more difficult to take advantage of the special training that men of military age may have. The ruling puts an end to voluntary enlistments on the part of men subject to draft but who have not been called by their local boards for examination. It also stops the practice of "inducting" into a specfic unit men who already have been called. This latest ruling will hamper to a considerable extent the formation of the mining regiments.

Resignations of Defense Council's Subcommittees Accepted

That the Council of National Defense has abandoned all idea of utilizing war-service committees made up of men closely associated with industries is indicated in a letter written by Director Gifford to the U. S. Chamber of Commerce which reads in part, as follows: "The several committees appointed by the Council of National Defense and by the Advisory Commission have in each instance tendered their resignations and, in order to prevent a continuance of the embarrassing situation wherein members of the committees were called upon to act both as Government agents or advisors and at the same time as representatives of their respective industries, these resignations have been accepted. For the purpose of furthering the valuable work instituted by the Government committees, however, it is most desirable that representative committees of the industries be formed by the industries themselves at the earliest possible moment." The National Chamber of Commerce has issued a call to every industry asking that representatives be sent to Washington for the purpose of appointing war-service committees such as those which formerly were integral parts of the Council of National Defense. Dec. 12 has been set as the date for opening this convention.

Large Imports of Spanish Pyrites in October

Returns received by the Committee on Chemicals show that 100,000 tons of Spanish pyrites were imported during October in 23 vessels. Importers handling 90% of the Spanish ore report that they are meeting the requirements of their customers fairly well. The committee points out, however, that the price of pyrites is likely to advance, due to the fact that Spanish operators will probably have to pay more for their coal.

Editorials

Some Data of Economics

THIS article comprises some figures that are fundamental in any consideration of present economics. We summarize them, without any attempt at coördination and without any special analysis and discussion, simply to enable our readers to get some broad views of things.

The wealth of the United States is variously estimated from 230 to 250 billions of dollars. This is represented chiefly by fixed investments—railways, houses, factories, mines, etc. The annual saving of the American people before our entering the war was roughly estimated at about six billion dollars. This also was put into fixed forms, being used for increasing the nation's housing capacity, railway facilities, etc.

This year we are spending about 12½ billion dollars for military purposes of our own, and are lending about six billion to the Allies. It is estimated that the expenditures for the following year will be about the same. Not all of our own direct military expenditures are wasted; for example, the very large expenditure for ships will represent an increase of our material possessions.

We cannot pay for the war out of existing capital, for that is chiefly represented by houses, railways, etc., which must remain as they are, although they furnish a sound basis for credit. As was correctly pointed out during the flotation of the first loan, the real payment for the war must be made out of the savings in the future. This is why thrift is being preached to the American people. It is hoped to increase the annual saving by five billion dollars or more.

The Director of the Census has furnished us with an estimate of 33,500,000 males, 16 years of age and over, employed in gainful occupations July 1, 1917. Of these, about 11,000,000 were employed in agriculture, 200,000 in the operation of electric and street railways, and 1,800,000 in the operation of steam railways, if the same proportion obtained as at the time of the census of 1910. There were, therefore, about 20,500,000 men employed otherwise. There are now about 2,000,000 men under arms. Assuming that the men engaged in agriculture and transportation be left undisturbed, the other working force has been diminished about 10%. However, that is not a correct assumption, for the draft has taken men from the farms and the railways, as from elsewhere. But it is a fact that the total working force of the country has been diminished by about two million men, although the net loss is not so great (and maybe there is no net loss) owing to offsets. The offsets are the increased employment of boys, of old men, and of women, and the forcing to work of the habitually idle, the number of whom is estimated at a high figure. Strange as it may seem, reliable accounts agree that even now there is much idleness among men who do not habitually avoid employment. One of the pressing problems of the time is to transfer these men from industries that are slack to others that are shorthanded.

The subject of man power is extraordinarily confusing. Not only is there the matter of absolute number, but also there is that which is even more important; viz., the quantity of work performed per man per day. It is notorious that along with the general increase of wages men have worked in many cases but five days a week, have reduced their effective work per day, and besides wasting time have wasted material. On the other hand, the administrators of business have offset this to some extent by increasing their own efficiency. The most noteworthy example is perhaps that of the railways, which in the second quarter of 1917 handled with each locomotive 16.1% more, and with each freight car 15.3% more revenue ton miles, than in the corresponding period of 1916; the gain being equivalent to the addition of 4985 locomotives and 361,000 freight cars to equipment, this being an even more astonishing showing when it is considered that a year ago the maximum car-producing capacity of the country was estimated at about 265,000. In other industries, the managements, spurred by necessity—the shortage and indifference of labor—have achieved important things. It will be seen, therefore, that it will be quite impossible to summarize man power until we are able to obtain fairly complete statistics of production.

It is manifest, however, that the prosecution of the war implies the transfer of men from one industry to another. A. C. Miller, a member of the Federal Reserve Board, stated in a recent address that a competent authority had advised him that it takes the labor of four men working in industries of one kind or another producing military and other necessary supplies to maintain one soldier at the front. This means that an American army of one million men will require the output of four million men working in factory, field and foundry. Besides this, there is the requirement of millions of our men for the munitioning of the Allies. All of this means the subtraction of men from nonessential occupations. The number of men so engaged in the United States is estimated at four million; we do not know on what authority.

Consideration of these figures forces the conclusion that it is impossible for the United States to continue "business as usual." We shall do very large business, probably in the aggregate more than ever before; but it will be concentrated in essentials, while business in many things that are not essential will be greatly contracted. During the period of change and readjustment there will naturally be troubles. As a corollary to the above conclusion is the theory that the harder people work, and the more efficiently they work, the better off will be everybody, labor included.

The second great conclusion is that the nation is bound to become thrifty. Unless it does, it will be unable to finance and fight the war at all. If it does, the

new principles of living thereby inculcated in the American people will be of incalculable benefit. As President Wilson himself remarked recently, they may be worth to the nation all that the war will cost it.

Mining Is a Matter of Engineering Rather Than of Democracy

IN AN effort to learn the truth regarding the labor troubles in the Far West, which gave rise to reports of a vast anti-American conspiracy under the auspices of the I. W. W., the *Evening Post* commissioned Robert W. Bruere to make a first-hand investigation and report his findings without fear or favor. His conclusions have been published in a series of articles in the *Post*. There has been but little published criticism of them, for the reason that Mr. Bruere's statements have not impressed those who are acquainted with Arizona conditions as being the observations of one who looked deeply and thoughtfully. The findings of Mr. Lenine and Mr. Trotzky, alias Braunstein, on such a mission would not attract any great attention, for example.

However, one of the subcaptions given to Mr. Bruere's last article—"Copper Companies Regard Mining as a Matter of Engineering Rather Than of Democracy"—engaged our attention. Mr. Bruere reported an interview with a mine manager whose idea was that if mine managers played with democracy they would never get out the ore. He did not consider mining to be either a problem of democracy or autocracy, but simply a problem in engineering. The dream of this manager was of a mine from which the ore might be extracted by automatic machinery, just as it is now crushed and concentrated and smelted by machinery.

We think that Mr. Bruere is for once right when he reports that copper companies regard mining as a matter of engineering rather than of democracy. If they did not so regard it there would be mighty few mines, either copper or lead, or any other kind, in operation today, and the world would be wondering about its metal supply. There are big mines today whose output is needed, that we cannot manage to work, but hope that we can if we succeed in getting them more mechanicalized. Yes, Mr. Bruere, you are right in grasping the idea that mining is an engineering job; but we do not believe you know the meaning of the idea. If you have any notion about running mines by democracy, you may examine what the workmen are doing with the Spassky, Kyshtim, Ridder and other great mines of Siberia. You are wrong, however, in your fantastic notion that "democracy implies intelligence, initiative; and these are precisely the most undesirable qualities in a mucker, the man who shovels the ore deep down in the stopes and drifts, the man who feeds the machines." On the contrary, you may learn, if you will take the trouble to do so, that the great effort of enlightened managements everywhere is to increase the intelligence and initiative of the men and enable them to draw more pay for the simple reason that they earn it.

It seems scarcely worth while to try to educate Mr. Bruere, and certainly we are not going to discuss his ideas of economics and sociology; but we cannot fail to draw attention to his reprehensibility in implying that mine managers deprecate the disappearance of the saloons, without which "the muckers have too much time to think of their troubles." If Mr. Bruere had been interested in making a real study of conditions he would have found that the mining companies of the United States, as well as industrial companies generally, have for many years back been in favor of the prohibition of alcoholic drink on economic grounds, and have done effective work in bringing that about.

Missouri Lead Mining Wages

THE mining companies of the Southeastern Missouri lead district are the first to make a reduction in wages. Heretofore wages have been going up steadily and steeply, but on Dec. 1 the Missouri companies put into effect a reduction of 75c. per day. This sounds like a good deal, but when it is considered in the light of a correction of extravagance and in comparison with pre-war conditions, the wages that these companies now propose to pay look generous.

Before the war the base rate for wages in this district was $2.40. During 1916, when the price for lead rose to about 7½c., the base rate was raised to $3.12½. During the extravagance of the lead market last summer, when the price for lead rose to 9c. and then went higher, wages were advanced to $4.20. The present reduction brings them back to $3.45, which is high in comparison with the rate of a year ago, although at present the price for lead is a cent a pound lower. It is estimated that the present rate is fully commensurate with the increase in the cost of living.

Evidently Great Britain, even after three years of war, is still experiencing the same troubles from the interference of bureaucrats in commercial affairs that we have been having. As a step in the organized protest against the extreme control of business interests by a multiplicity of new departments, a meeting of representative merchants was held recently in London. One speaker remarked that some of the departments at Whitehall affected a knowledge of business that they did not possess and he considered that much of the trouble in Great Britain was due to people doing jobs that they did not understand. This has a familiar sound.

The 11th Engineers, U. S. A., is a New York regiment, in which our distinguished friend Arthur Dwight is senior major, while Irving and Stehli, geologist and metallurgist respectively, are captains. This regiment, or part of it, ran into the thick of the recent fighting near Cambrai and covered itself with glory. It suffered losses, and we await fuller news with anxiety. But we rejoice over its bravery and achievements. One of the first regiments to go, it has been—in its capacity as a railway regiment—the first to work right up to the front, and it has shown itself as expert with the rifle as with the pick and shovel. Here's to the 11th Engineers!

Mr. Adkinson's article on "The Commonsense of Mine Management" does not read as if it had been composed in any Bolsheviki atmosphere. On the contrary there is a fine old-fashioned American flavor about it, the recognition of the spirt that made American industries

great and will make them greater. The Socialists who are so anxious to reduce all industry to the fertility of Sahara, out of their indignation over some hard-working and thrifty people having become rich, neglect to consider that neither Capital nor Labor will prosper without the assistance of Brains. The Bolsheviki are trying to run Russia without Brains. The philosophy that puts the cleaner of sewers and the bacteriologist on the same level as servants of the public health is lunacy. Although Mr. Adkinson had no intention of discussing this broad subject, his commonsense has a bearing upon it.

BY THE WAY

"Whatever job I had," says Henry P. Davison, "was to me always the very best job in the world and I tried to fill it. I made no elaborate plans for the future. If I had any system in my labor it was first to do my own work; second, to teach the fellow below me how to take my place; third, to learn how to fill the position ahead of me."

Of 14 men of foreign birth employed in the sampling department of the Raritan Copper Works at Perth Amboy, N. J., there was but one American citizen before the war started. Today, according to the *Ingot*, every man in the department is a citizen. Thirteen of these men subscribed to the first Liberty Loan, and 11 to the second, so that at present every man in the department owns at least one bond. The sampling department has surely set an example that others might well emulate.

The will of the late Grant B. Schley, who put the Britannia copper mine on its feet, was filed for probate at Somerville, N. J., on Dec. 3. It was written on a half sheet of note paper and disposed of an estate said to be valued at more than $5,000,000. It was dated Mar. 29, 1913, and gave the estate in equal shares to the surviving children, one daughter and three sons. A fourth son, Chaloner Schley, was named in the will, but his death preceded that of his father by a few months.

A company working under Government contract pays its men for an eight-hour day. The workers get "time-and-a-half" for overtime. During the overtime, for which they receive, on an average, about one-third of their total day's pay, they frequently stand about and discuss literature and music and such other topics as workmen are given to discussing, and do such work as inclination dictates, says the *Evening Post*. The company does not so greatly mind. It figures that it can get at least a little work out of the men on overtime, and that places it so much to the good. Under the contract the Government pays all overtime.

Electrified railroads in the United States have meant important savings in coal to the nation. The St. Paul electrification over the Continental Divide is not only demonstrating remarkable results from an operating standpoint, but in the year of coal shortage has saved 200,000 tons. It has been found on the St. Paul electrified Rocky Mountain division, for instance, that the electric engine handles about 3½ times as many ton miles per month as the steam engine, and that the electric engine cuts from the time to do a given business 30%, partly by faster running and partly because of its ability to haul heavier trains.

The old adage about "sending coals to Newcastle" has been realized on a small scale in San Bernardino County, Calif., only in this instance it has been modernized into sending scheelite ore to the Atolia district, which has become noted in recent years for its production of this tungsten ore. The shipments were made from Los Angeles and reveal a peculiar situation. It seems that during a period of high-grading, the thieves shipped a great deal of scheelite ore to Los Angeles and got some of the Los Angeles buyers into trouble. Now scheelite that accumulates at Los Angeles stands reshipment to Johannesburg, from which point and Atolia it is safe to ship to Eastern markets. In other words, the Eastern buyer is a little bit afraid to purchase direct from a Los Angeles buyer.

In explaining to Congress, in his annual report, the wisdom in having released miners from their assessment work, Franklin K. Lane, the Secretary of the Interior, cites the following instance: "A stalwart westener came in early in May to say that he would like to enter the Army, but if he did he could not hold his mining claim. He was a typical prospector, of steel-frame construction, without a superfluous pound of flesh, and the long-range eye of the man who lives in the open—the very stuff of which the best soldier is made. But the fruit of his life's work was all to be found in a few holes in the ground and a few pieces of paper tacked on trees or posts in the mountains of the West. He was willing to take his chances of returning if the Government which wished him to go would be good enough to hold his property until his return without exacting the yearly labor which the law required."

During last summer a mass of high-grade pyrite was found near the rails of a narrow-gage tramway on a sugar estate in the northern part of the district of Oriente, Cuba. The lump of ore weighed about 70 lb. and had every appearance of containing at least 45% sulphur. The owner of the estate, being interested in mines in other localities, spared no effort or expense in endeavoring to trace the source of the "float" rock. One puzzling feature of the case was the fact that the specimen was not oxidized. Yet investigation brought to light no news of any excavation that could have produced the sulphur ore. At length some smaller pieces were found near the blacksmith shop of the cane-grinding mill and the mystery was solved. A vessel that took pyrites from Huelva to an Atlantic port had been hastily unloaded and at once took on a cargo of coal for the port of Antilla, Cuba. Some of the coal reached the sugar mill and the local blacksmith, finding the pieces of pyrite undesirable as fuel, had tossed them aside and forgotten their existence. In the course of the search for sulphur ore, the investigation uncovered a small vein of chalcopyrite and also a deposit of chromite. The latter has yielded some fair specimens and will be developed in due time.

Join the Comfort Club

Those who have contributed to the fund to buy comforts for the men of the 27th Regiment of Engineers have done so without thought of gain. It is called patriotic to buy Liberty bonds, war-saving stamps and the like, though in all these things, one simply invests and will receive back his principal with interest. But mining men now are called on to give. There will be no reward or profit save the knowledge of duty done, the duty of taking care of one's own. Engineers at home must second those at the front by standing directly behind them. That they will do this and are doing it is evidenced by the fact that the subscriptions received have already swelled the total to almost $3200 though the campaign is but 12 days old. The following gifts have been received to date:

Engineering and Mining Journal	$1000.00
New York Engineering Co.	1000.00
A Friend, Nov. 23	5.00
H. H.	5.00
D. E. Charlton	5.00
H. W. Hardinge	1000.00
Frank N. Spencer	5.00
W. L. Coursen	5.00
J. H. Polhemus	5.00
J. H. Janeway	10.00
Albert D. Beers	10.00
J. E. Hayes	10.00
J. A. Van Mater	25.00
L. Vogelstein & Co.	100.00

Capt. Percy E. Barbour, the deputy-superintendent of the New York State Constabulary, has written us expressing his approval of the scheme of adopting the 27th Engineers. Capt. Barbour says:

I want to tell you how glad I am about the scheme for adopting the 27th Regiment, as given in your editorial in the current number of the *Journal*. I think it is "bully" and hardly know which I prefer, whether to be in the regiment or be in your office pushing the adoption of the scheme. I am also much pleased with the insert in the *Journal* this week, and the editorial with reference to it.

Congress has voted billions for troops but none of it is spent on the little things that men need to keep cheerful. Unless these are provided through some such means as the Comfort Club, they will in a large measure be wanting. Picture to yourself what a lack of such comforts means when the hardships of life at the front must be borne. Bear this in mind and join the Comfort Club and get others to join. Your check drawn to the order of the *Engineering and Mining Journal* is all that is necessary. Back up the Twenty-Seventh.

Price for Silver To Be Fixed

Treasury officials on Dec. 3 held the first of a series of conferences with Western silver producers looking to the ultimate fixing of a standard price for silver, effective for one year, and to Government acquisition of options on practically the entire output of the United States. The plan contemplates Government control of American silver at a fixed price. Jewelers and other silver users would continue to receive a supply under the tentative Government plan, probably at the standard price. Details of the arrangement are yet to be worked out, however, and officials emphasized the statement that for the present the Government is interested mainly in obtaining sufficient silver for its own and Allied coinage needs.

Raymond T. Baker, Director of the Mint, Charles S. Hamlin, member of the Federal Reserve Board, and Albert Strauss, foreign exchange expert and the Treasury's representative on the War Trade Board, represented the Government in the conference. In addition to the silver producers, most of whom were from Nevada, there were present Senators Pittman, Smoot, Ashurst, Newlands and Shafroth, and Governor Boyle of Nevada. Producers from other Western states were expected to join in the conference during the week.

Australian Mineral Production

The 1915 production of minerals in the six states of Australia and the Northern Territory, as reported by the Commonwealth Bureau of Census and Statistics, is shown in the accompanying table:

THE 1915 MINERAL PRODUCTION IN AUSTRALIA

Substance	Unit	Quantity	Substance	Unit	Quantity
Alunite	Tons	(a) 1,420	Kaolin	Tons	2,378
Antimony	Tons	11,943	Lead (pig, etc.)	Tons	33,687
Bismuth	Tons	274½	Limestone flux	Tons	293,360
Coal	Tons	11,415,451	Manganese	Tons	1,260
Coke	Tons	(a) 417,753	Molybdenite	Tons	129
Copper ingot and ore	Tons	45,324	Platinum	Oz.	(a) 56
Diamonds	Carats	(a) 839	Salt	Tons	(b) 64,000
Diatomaceous earth	Tons	439	Scheelite	Tons	35
Gold	Fine oz.	1,947,002	Shale	Tons	(a) 15,474
Gypsum	Tons	20,590	Silver	Oz.	3,713,488
Iron, pig	Tons	(a) 76,318	Silver-lead ore	Tons	293,391
Iron oxide	Tons	238,496	Tin ore	Tons	7,576½
Ironstone flux	Tons	46,858	Wolfram	Tons	613
			Zinc	Tons	(a) 190,923

(a) All from New South Wales.
(b) Exclusive of Victoria, figures of which are not available.

The total value of the principal minerals produced in the Commonwealth in 1915 was reported as £22,396,782, of which New South Wales contributed £9,598,179.

Idaho Mining Association Protests War Excess Profits Tax

At the meeting of the Idaho Mining Association in Wallace, Idaho, on Nov. 24, 1917, for the consideration of business, political and industrial matters affecting the mining industry of the State of Idaho, and incidentally of the nation, the association recorded its conviction that the mining industry should bear its just and equitable proportion of all expenses of government, national, state and municipal, under which it is protected, and that it should and does stand ready to meet all taxes imposed upon it by constituted authority, and particularly those taxes imposed by the War Revenue Law passed by the Congress, and the assurance was expressed that the industry will support all war burdens imposed by the Government even to the limit of the confiscation of all its property, if that be necessary, to bring about a successful termination of the war.

The association declared, however, that the war tax should be levied under a fixed principle to the end that all shall be equally taxed, and the following resolutions were ordered spread upon the minutes:

Whereas, Examination by business men, expert accountants, lawyers, auditors and professional men from the ranks of all industries, professions and business connections has resulted in the unanimous condemnation of the measure now upon the statute books, and particularly that section of it described under Title 2, War Excess Profits Tax; and

Whereas, It is the unanimous opinion of those persons, companies, corporations, partnerships and firms which are called upon to pay the taxes described, that the so-called new War Excess Profits Tax Law is unfair, discriminating and impossible of uniform interpretation; and

Whereas, An examination of the law in question reveals that its provisions will cause unjust discrimination in favor of heavily capitalized companies as against companies having small capitalization; for example, we find in attempting to apply the principles of the War Excess Profits Tax to the mining industry that a company with a large capitalization will pay only 5 to 15% of its net income, while another company, owning a mine of the same value, and realizing the same profits, but having a small capitalization, will be compelled to pay from 40 to 75% of its net income, according to the many constructions that may easily be read from the law; and

Whereas, Investigation of the history of this legislation in Congress reveals that it was hastily and ill-advisedly framed; now therefore be it

Resolved, That the Idaho State Mining Association, in meeting assembled, does hereby condemn and denounce this so-called War Excess Profits Law as being so vague, ambiguous and contradictory as to be practically incapable of understanding and unworkable; and we call upon Congress to repeal this unfair and unworkable law, and substitute therefore a special War Income Tax on substantially the same plan or principle now adopted in the case of individuals, and regardless of pre-war conditions, regardless of capitalization and based solely upon income, in accordance with a graduated scale, and permitting such exemption as may be equitable.

War-Tax Exemption Suggested for Gold-Mining Companies

The case of the gold miner is presented by the Oatman Bureau of Mines, of Oatman, Ariz., in a circular, in which the claim is advanced that it is just and fair under present conditions to exempt gold-mining companies from paying any extraordinary war tax to the Government. There are, of course, gold-mining companies still able to operate at a profit even with the high prices prevailing, but the Bureau contends that the constantly decreasing output of gold for the entire country is indisputable proof that the gold-mining industry as a whole is seriously threatened.

During the past three years, the average prices of commodities have increased, it is stated, more than 40%. Gold, however, remains at $20.67. Thus gold will buy only 60% as much as it would three years ago. On the other hand, the cost of producing this gold has increased about 35%. For example, a certain mine contains ore averaging $4 per ton in gold. For years its average operating costs have been $3, leaving a net profit of $1 per ton. Now, however, costs have increased 35%, or slightly more than $1 per ton, wiping out the profit. If gold were taken out it would buy only 60% as much as could have been purchased three years ago with the same amount. It has therefore been wisely decided to shut down until a return to normal conditions.

But the most serious phase of the case is that relating to the partially developed gold property or prospect. There are many such with proven deposits of ore in sight, but the outlook is not such as to encourage further development and production. Capital cannot readily be induced to invest in an industry subject to increasing costs, and heavy war taxes besides, without any opportunity to take advantage of enhanced value of the product.

It is this combination of unfavorable circumstances that is causing the depression in the gold-mining industry and the reduction in the output of gold. For the first six months of 1917, the total production is stated to have declined more than 15% as compared with 1916, which was much below the average for the past 10 years. Unless some assistance is extended to the industry, this decrease will continue at an accelerated pace as long as war conditions prevail.

On behalf of the gold-mining industry in general, and the allied interests dependent thereon, the Bureau therefore asks that some measure of relief be devised by the Government, in order that gold production may be maintained. As one means of attaining this end, the exemption of gold-mining companies from paying any extraordinary war tax to the Government is urged.

Engineers in Action Near Cambrai

American engineers, thought to be members of the 11th Regiment of Engineers, who were working in the region of Gouzeaucourt, south of Cambrai, joined the fighting ranks of the British when the latter were surprised by the German onslaught on Nov. 30 which resulted in Gouzeaucourt being enveloped for a time. The attacking forces was greatly superior in numbers and every man was needed to resist its onward sweep, says the press dispatch. Hundreds of Americans and several trains operated by them were in this section when the Germans, without warning, swept forward in masses toward the town. Many Americans working in the rear areas immediately provided themselves with rifles, and joined the hard-pressed British, or turned their hands to other important work.

One of the trains run by an American crew was west of Villers-Guislain, which was the first place through which the Germans charged on the southern flank of the offensive. Shells suddenly began to fall about the engineers, and almost immediately they saw a horde of gray-coats charging toward them. The engine driver saw there was no time to linger, and ran for a nearby shell hole. His four helpers sought similar shelter, where all five lay for hours, with the Germans all about, and only escaped after the British had counter-attacked and driven the enemy back.

The crew of another train near Gouzeaucourt had an exciting experience with a German airplane. The aviator swooped down on them from the north and began firing with a machine-gun. The airman's fire became so hot that the engineers were forced to run for shelter.

After the British had pushed the Germans out of Gouzeaucourt and back from the ridge to the east, the engineers were asked to furnish volunteers for patrol work during the night. As only a limited number was required, nearly a hundred were selected and armed. All night they kept the watch amid shell fire and bullets from the machine guns and rifles. They could have done no better if they had been picked troops from regular infantry, and their work was commended highly.

Several American units, working in the back areas, came under very heavy shell fire as the German attack progressed. The latest reports say that several Americans were actually captured by the Germans, but escaped after a few hours, and made their way back to the British line.

The 11th Regiment of Engineers was recruited in New York last May and was one of the first to be sent abroad. At that time the colonel commanding was Charles H. McKinstry and William Barclay Parsons was a major. The mining industry is represented in this regiment by Maj. A. S. Dwight, and Captains John Duer Irving and H. J. Stehli.

Personals

Victor G. Hills is making a mine examination at Chloride, Arizona.

J. D. Chynoweth, of Houghton, Mich., has received a commission as second lieutenant of infantry.

Joseph Stringham, Jr., has been commissioned a captain and is at the Rock Island Officers' Training Camp.

Dr. Horace B. Patton has recently completed investigations of oil lands in Wyoming and northern Colorado.

Rush T. Sill, of Los Angeles, has just returned from a business trip to Mexico City and Pachuca, Mexico.

Harry J. Wolf, of the Malm-Wolf Co., is investigating manganese and vanadium properties in southwestern Colorado.

Garrett F. Johnson, lately instructor at the Michigan College of Mines, has been commissioned first lieutenant in the field artillery.

V. C. Barnett expects to go to France at an early date for service in the American Expeditionary Force as a topographical draftsman.

George T. Fonda, safety engineer for the Bethlehem Steel Co., Bethlehem, Penn., has been appointed director of labor and safety for all plants of the company.

Corey C. Brayton and **E. R. Richards** have temporarily closed their San Francisco offices in order to give more time to their operations at Midvale, Utah.

C. H. Cooper, assistant superintendent of the Calumet & Hecla smeltery at Hubbell, Mich., has been appointed a captain in the Coast Artillery, U. S. Reserve.

A. H. Meuche, recently superintendent of the Cass Copper Co., in northern Michigan, is on the staff of the Hollinger Consolidated Gold Mines, Ltd., at Timmins, Ontario.

William H. Jobe, formerly of Crystal Falls, Mich., has been appointed superintendent of the Raimund mines at Bessemer, Ala., belonging to the Republic Iron and Steel Co., of Birmingham.

Robert R. Wiggins, recently in Nicaragua, and **Raymond C. Mahon**, lately at Iron River, Mich., have been commissioned first lieutenant and second lieutenant, respectively, in the Signal Corps, Aviation Construction Division.

S. Kawasaki, chief government geologist in Chosen, has been investigating mining conditions in the Cobalt, Porcupine and Sudbury districts of Ontario for the Japanese Government and was recently in Toronto on his way back.

F. Julius Fohs, oil geologist, who recently opened an office at 60 Broadway, New York, announces that members of his staff completed investigations in Louisiana, Southeastern Texas, Northern Texas, Oklahoma and Kansas during November.

Dr. Raymond F. Bacon, director of the Mellon Institute of the University of Pittsburgh, will be commissioned a lieutenant-colonel in the ordnance division of the War Department, and will be directed to take charge of the chemical work for our armies in France.

C. P. Perin, of Perin & Marshall, New York, who has been in India for some months in connection with new construction at the works of the Tata Iron & Steel Co., Sakchi, Bengal, will probably remain in India until some time in 1919. **T. W. Tutwiler**, general manager of the company, will leave India for the United States early in January and plans to be in this country a considerable part of next year. In the meantime, Mr. Perin will have charge of operations at Sakchi.

Charles T. Main, a consulting engineer, of Boston, has been elected president of the American Society of Mechanical Engineers. He was born in Marblehead, Mass., in 1856 and was educated at the Massachusetts Institute of Technology, from which he was graduated in 1876. Since 1892 he has practiced as a consulting engineer, with offices in Boston, being associated until 1907 with F. W. Dean in the firm of Dean & Main. Mr. Main has designed and supervised the construction of numerous industrial, steam-power and water-power plants, among his largest undertakings being the Wood Worsted and Aver Mills in Lawrence, Mass., and four hydro-electric developments for the Montana Power Co., aggregating about 280,000 hp. He became a member of the American Society of Mechanical Engineers in 1885, and served on its board of managers for the last three years. He is also a member of the American Society of Civil Engineers and a number of other engineering and technical societies.

Obituary

Abraham Gibson, one of the oldest residents of Haileybury, Ont., and a prominent mining man, died suddenly on Nov. 25. He went to the Cobalt camp in its early days and was successful in South Lorrain. He held claims in many places in northern Ontario.

Emory H. Diehl, assistant general manager of the United Alloy Steel Corporation, Canton, Ohio, died Nov. 20 after a short illness, age 33 years. He was graduated from the Pennsylvania State College in 1906 and was connected for a time with the Carnegie Steel Co., which he left four years ago to become associated with the Canton plant.

Societies

American Institute of Mining Engineers, Columbia Section, held its seventh annual meeting on Nov. 17, at Kellogg, Idaho, in the Y. M. C. A. building. Officers for the ensuing year were elected. R. S. Handy, presented a paper on "Hand Sorting of Mill Feed."

Engineers' Society of Western Pennsylvania held a meeting in the Union Arcade Bldg., Pittsburgh, Penn., on Dec. 4. A paper entitled "Manufacture and Use of Die Castings" was presented by Charles Pack, chief chemist and metallurgist of the Doehler Die Casting Co., Brooklyn, N. Y.

American Chemical Society, New York Section, will hold its third regular meeting jointly with the New York Sections of the American Electrochemical Society and the Society of Chemical Industry on Dec. 7, in Rumford Hall, New York. National wastes that can be prevented by the application of chemistry will be the theme of discussion with especial reference to raiment. Papers on leather, textiles and waterproofed and protected fabrics will be presented by Allen Rogers, of Pratt Institute, J. Merritt Matthews, editor "Color Trade Journal," and H. P. Pearson and F. Sundermann, of Cravenette Company.

United Engineering Society—A general meeting of the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers was called for Friday evening, Dec. 7, in the Engineering Societies Auditorium, 29 W. 39th St., New York, for the purpose of welcoming the American Society of Civil Engineers into the fraternity of founder societies and into occupancy of the enlarged Engineering Societies Bldg. Appropriate ceremonies were announced to signalize the association of the four societies under one roof.

Alaska Mining and Engineering Society held its annual meeting on Oct. 17, 1917, at Thane, Alaska. The society was the guest of the Alaska Gastineau Mining Co., of which the president of the society, G. T. Jackson, is manager. The following papers, descriptive of the practice at the Gastineau mill, were read: "General Mill Practice," by E. V. Daveler, mill superintendent; "Flow Sheet in the Mill," by R. Hatch, assistant mill superintendent; "Mechanical Department," by H. E. Garlock, master mechanic; "Sampling, Assaying and Refining Methods," by Fred Hodges, chief chemist; and "Electrical Operations," by Emil Gastongway, chief electrician. Officers were elected for the ensuing year, as follows: John Richards, president; Earl Daveler, vice-president; C. K. White, secretary-treasurer. W. S. Pullen and C. E. Davidson were elected members of the executive committee.

Colorado Chapter of the American Mining Congress was organized at a meeting held on Nov. 28 in Denver. A board of 15 directors was elected as follows: To serve two years: Samuel D. Nicholson, Charles A. Chase, R. S. Ellison, Irving T. Snyder, Rens Schirmer, of Idaho Springs, Robert M. Henderson, of Breckenridge, and Max Schott; to serve one year: Frank Bulkeley, George L. Nye, E. A. Colburn, Walter Page, of Leadville, Nelson Franklin, of Rollinsville, George E. Collins, M. S. MacCarthy and J. F. Welborn. A meeting of this board was announced for Dec. 1, for the purpose of electing a governor and three vice-governors. A committee was appointed to attend the Utah state conference in Salt Lake City on Dec. 4 to discuss the stabilizing of the metal market on silver, lead and spelter, and to outline amendments to the war-tax law. A telegram was sent to the Washington headquarters of the American Mining Congress urging the selection of a mining man on the newly appointed advisory board of the excess war-profits administrative council.

Industrial News

Asbestos Protected Metal Co., of Pittsburgh, announces that it is now represented in the State of Georgia by J. F. Schofield's Sons Co., of Macon.

Stewart & Holmes Drug Co., Seattle, Wash., has opened a new store for its assay-supply department at Third Avenue South and Main Street.

Mark R. Lamb is buying belt conveyors, transmission belts and transmission machinery for Bolivia. About $11,000 is involved in the present order.

Sullivan Machinery Co. announces that Wallace T. Roberts, hitherto sales manager for the company in lower Michigan, northern Ohio and northern Indiana, has been appointed district manager at Denver, succeeding Capt. Matthew R. Blish, Ordnance Department, U. S. A., acting manager at Denver since last May. George W. Blackinton, manager at Denver up to May last, is captain commanding Third Battalion, 353rd Infantry Regiment, N. A., Camp Funston, Kansas.

Pacific Electro Metals Co., of San Francisco, has put into operation a plant for manufacturing carbon electrodes from petroleum coke on San Francisco Bay, at Bay Point, Contra Costa County, Calif. The electrodes are for use in electric furnaces and possess a high conductivity on account of the low-ash content of the raw material. Another plant for making ferro-alloys is in course of construction at the same place and will be in operation within the next 30 days and will consume at the start approximately 10,000 kw. The alloys to be produced include: Ferrosilicon, ferromanganese, silicomanganese, ferrochrome, ferromolybdenum and ferrotungsten. Raw materials for all these alloys are available in abundance on the Pacific Coast. The company is a Nevada corporation, although exclusively represented by California capital. The plants have been designed by the Beckman & Linden Engineering Corporation.

New Patents

United States patent specifications listed below may be obtained from "The Engineering and Mining Journal" at 25c. each. British patents are supplied at 40c. each.

Conveyor. Robert E. Briggs, Columbus, Ohio, assignor to the Jeffrey Manufacturing Co., Columbus, Ohio. (U. S. No. 1,247,365; Nov. 20, 1917.)

Draftsman's Lamp. Ralph Leon Rizer, Cumberland, Md. (U. S. No. 1,247,454; Nov. 20, 1917.)

Electrolysis of Zinc — Electrodeposition and Extraction of Zinc. Urlyn Clifton Tainton, London, and John Norman Pring, Chester, England. (U. S. No. 1,247,179; Nov. 20, 1917.)

Excavating Apparatus. Thomas Spencer Miller, South Orange, N. J. (U. S. No. 1,247,309; Nov. 20, 1917.)

Explosive Charges—Device for Inserting Explosive Charges in Earth. Edwin K. O'Brien, Charlottesville, Va. (U. S. No. 1,247,567; Nov. 20, 1917.)

Iron Alloy Containing Uranium. Joseph M. Flannery, Pittsburgh, Penn., assignor to Standard Chemical Co., Pittsburgh, Penn. (U. S. No. 1,247,252; Nov. 20, 1917.)

Liquid Gage. Tetsushiro Nakamigawa, New York, N. Y. (U. S. No. 1,247,293; Nov. 20, 1917.)

Manganese Carbonate, Process for the Oxidation of. Morduch L. Kaplan, Brooklyn, N. Y. (U. S. No. 1,247278; Nov. 20, 1917.)

Maps—Apparatus for Carrying and Exhibiting Maps, Charts, and the Like. Charles Hamlet Cooper, Wimbledon, England. (U. S. No. 1,247,227; Nov. 20, 1917.)

Mill—Combination Stamp, Crushing, and Grinding Mill. Arthur F. Levitt, South Pasadena, Calif. (U. S. No. 1,247,293; Nov. 20, 1917.)

Mold-Heating Furnace. Jacob M. Roth, Pittsburgh, Penn. (U. S. No. 1,247,015; Nov. 20, 1917.)

Open-Hearth Furnaces, Method of and Apparatus for Tapping. Melton A. Smith, Vandergrift, Penn. (U. S. No. 1,247,606; Nov. 20, 1917.)

Ore-Feeding Means for Furnaces. Glen A. Williams and Homer A. Thayer, Pittsburg, Kan. (U. S. No. 1,247,050; Nov. 20, 1917.)

Ore Treatment—Treatment of the Ores of Certain Metals. Robert Lance, Paris, France. (U. S. No. 1,247,413; Nov. 20, 1917.)

Editorial Correspondence

SAN FRANCISCO—Dec. 1

Activity in Oil Lands is marked by recent permits issued by the State Corporation Department to the California Oil Co., of Oakland. The company is permitted to issue 1,000,000 shares of common stock, 500,000 shares of preferred stock and $500,000 worth of five-year gold notes to the B. B. & E. R. Dudley Petroleum Co., in exchange for oil lands in Lost Hills and Belridge oil fields in Kern County. Also additional shares for 40 acres of oil lands and leases in the Pismo or Tiber oil fields in San Luis Obispo County and lease covering 199.33 additional acres in Pismo oil fields. A permit to sell 600,000 shares preferred stock at $1 was granted on condition that common shares previously issued be deposited in escrow pending further order of the commissioner. It is provided that $75,000 out of the sale of the preferred stock shall be used in sinking, operating wells and increasing the present equipment in the Pismo oil fields.

High-Grade Comstock Ore extracted from the Union Consolidated is again attracting the attention of operators. Stope No. 2 in the south drift on the 2400-ft. level produced 95 tons which sampled $50.35 per ton. In another stope 30 tons sampled $48.15. During the week ended Nov. 24, the mine put through the mill 393 tons averaging $29.14, and 118 tons second-class ore averaging $16.65. But little ore was extracted from the other Comstocks. In the Consolidated Virginia, the west drift on the 2700-ft. level was advanced 13 ft. and passed through 6 ft. of vein matter of quartz, clay and porphyry, with a strong flow of water. The quartz assayed from $1.91 to $2.97 per ton. The Andes saved 77 cars of low-grade ore. In the Gold Hill district, the Jacket surface tunnel produced 22 cars of fair-grade ore. The mill continued work on new equipment and building and the old cyanide plant operated during the week.

Demand for Molybdenite has encouraged prospecting and development in San Diego County in the region of Cottonwood Creek, east of Ysidro Mountains. The present development by the Tecate Mining Co., is on four claims situated between Cottonwood Creek and Potrero. The company has obtained permission from the commissioner of corporations to issue 80,000 shares common stock to owners of the mining claims, in exchange for the property, and to sell 60,000 shares preferred stock at $1 per share; the shares are to be held in escrow, pending further orders of the commissioner. The claims are situated on what is assumed to be an extension of a broad diorite dyke in which are indications of molybdenite. Records of the State Mining Bureau show that molybdenite is widely distributed in California, occurring in small flakes and leaves in quartz and crystalline rocks. Molybdenite is found with malachite and chalcopyrite at Potrero in San Diego County and in granite at Campo, which is about 10 miles east. The two districts lie along the Mexican border but well within California. The mineral is also found in the Grapevine district in this county. Other counties in which molybdenite is found are El Dorado, Fresno, Inyo, Madera, Mariposa, Mono, Napa, Nevada, Placer, Plumas, Shasta, Tulare, Tuolumne and Riverside, making a total of 16 counties in which there has been little development and of which there are no extensive records. This and other special minerals have not been largely prospected for in California until the war created an increase in the demand, although chrome and manganese had been mined prior to the war. The failure to develop and mine special minerals in California has for many years been due almost solely to the lack of transportation at reasonable cost. In fact, there are many minerals in the state that have remained undeveloped for this reason.

BUTTE—Nov. 28

Owners of Silver Properties are preparing strong protests to Washington against fixing the price of silver as it is argued that this metal does not enter into the manufacture of articles required by the Government for war purposes and therefore it is not proper that the Government should interfere. There is a movement on foot to join with the Nevada operators in sending a delegation to Washington to enter a formal protest against fixing the price at a rate per ounce of anything below $1. Some of the silver-mine owners who have had their properties idle for years have taken steps to organize a campaign against the Government fixing a price.

Copper Costs are the subject of much discussion just now among mining men. It is said that with the Government price of copper fixed until the first of the year at 23½c. per lb. the Anaconda Copper Mining Co. with all its economic installations in the last three years is making only a little money. Three years ago the miners were being paid $3.50 a day and today they are receiving $5.25 and everything entering into production has increased from 30% to 300%. There is no doubt the Anaconda company is making some money, but its profits are small compared with three years ago. The small operators in some cases have a hard job making both ends meet. There is a general feeling that the Government realizing the existing conditions at the first of the year will increase the price to at least 25c. per lb. In this district the output is gradually working back to normal, but the demand of the Government for copper has been so heavy of late that it is contended that there is very little on hand to supply the local consumption and at the same time keep the Government demand up to requirements. By the first of the year the North Butte company is expected to again enter into the producing class at the normal rate, as by that time the Granite Mountain shaft will be in operation after the fire of last June. At present the North Butte is hoisting at the rate of about 45 carloads a week through the Speculator shaft.

SALT LAKE CITY—Nov. 30

Old Coal Mines for several years idle in Weber and Summit counties are experiencing a revival and new properties are being brought in here, as the demand for coal increases. At Coalville in Summit County, the old mine, formerly operated by the Superior & Briquette Co. but closed down for five years, is being worked under the name of the Summit Fuel Co., The Weber mine has a large number of teams at work hauling coal to the railroad at Coalville 1½ miles away. A railroad spur is being built to this property. A new property, 9 miles from Coalville, is producing 140 tons of coal daily, Chapelle Bros. being the operators. The Grass Creek mine is producing at capacity.

The Utah Coal Route opened for traffic today, and it is expected that operation by this road will soon make itself felt in the betterment of the coal situation. The new railroad has its terminal at Provo, where it connects with the Denver & Rio Grande, the Salt Lake Route, and the Orem electric line. A large part of the rolling stock has arrived and the remainder is coming in, although there is necessarily some delay, owing to Government requirements. Four out of the six locomotives are on hand and the two remaining are expected within two weeks. The cars which are of the all-steel, "dump" type, of capacity of 100,000 lb. each, will be made to carry 125,000 lb. wherever this can be done.

Oil-Shale Exploitation may be hastened by the present rapid consumption of oil and gasoline without the accompanying discovery of new oil fields to take the place of those in danger of exhaustion. There is no question but that there is a large reserve of oil fuel available, both in this state and in Colorado, as soon as a suitable and economical process of distillation shall have been found. Certainly effort in this direction has been stimulated. Experiments conducted for some time at the University of Utah—along the lines of a process, which has for many years been in successful operation in Scotland—are said to indicate the possibility of profitable recovery by means of steam distillation. The experiments have been made in what is described as a somewhat crude apparatus, consisting of an upright cylinder about a foot in diameter, surrounded by masonry, with a furnace underneath. The shale and sand, superheated by steam, are subjected to a heat of from 900° to 1000°. The oil and the gases pass through a series of pipes and the ammonium sulphate, gas, naphtha and crude oil are segregated. It is stated that the process has been so far improved that the various grades of oil can be segregated, although this has not been done in the testing plant on the University grounds. The average results of the tests made at the University plant, on shales from near Elko show the crude oil per ton of shale to be 45 gal. and gasoline from gas—if desired—14 gal., making a total of 59 gal. In addition to the gasoline from gas, tests are said to show 80% of gasoline can be extracted from the crude oil. Coincidentally, with the above results two other processes have been announced, one of these by a Nevada man and the other by a local engineer, but details as to these have not been given out. It may be of interest here to note that the early Mormon pioneers operated a still for the extraction of oil from shale, before the date of the Pennsylvania discoveries; and the ruins of an old still near Juab are said to remain. Oil shales are found extensively in eastern Utah, and there are large beds in Utah, Sanpete and Juab counties. Oil sands occur near the San Wayfall swell, and in parts of Wayne and San Juan counties.

DENVER—Nov. 30

Excess Profit Tax provision of the income-tax law is regarded by Colorado mine operators as an unfair discrimination, which places proportionately heavier burdens upon producers with small invested capital than upon those of large capitalization. It is pointed out that a strict administration of the excess-profits law will penalize conservative financiers and create considerable confusion and restrictive conditions detrimental to the industry.

Fixing the Price of Silver by the Government is viewed with alarm by Western mine operators who are interested in the production of silver, and who have undertaken the development of silver properties. These operators claim that the unsettled price of silver is sufficiently disquieting to the silver-mining industry, without adding price fixing by the Government. There seems to be some difference of opinion as to the ultimate value of price fixing, but all agree that if a commercially profitable price is not allowed on silver, then silver producers will be heavy losers.

Issuance of New Securities should not be interfered with during the period of the war, as advocated by the American Defense Society, unless the lawmakers think that it will be an advantage to the Government to stop all vital and legitimate promotions of new enterprises. The move to force the passage of a law in the coming session of Congress prohibiting the issuance of new securities except by Federal license is ill-advised according to most enterprising mining men of the West. Such a law would practically stop all mining and oil promotions, good or bad. Bad promotions should be prevented in some other way, it is felt here, than by placing restrictions on the development of new and worthy enterprises which may be of advantage to the Government in the near future.

WALLACE, IDAHO—Nov. 30

Idaho Mining Association took definite and positive action with the view to impressing Congress with the necessity of practically rewriting the section of the war-revenue law imposing a tax on excess profits. The meeting of the association was called to take action on various subjects that are of special interest to the mining industry, but most of these were passed up for the reason that it was the unanimous opinion that a change in the excess-profits law was of far more pressing importance. The action of the meeting is reviewed elsewhere in this issue of the "Journal." The meeting of the association in this city was thoroughly representative of the industry of the state. Among the important operators present were James F. McCarthy, manager of the Hecla Mining Co.; Frederick Burbidge, manager of the Federal Mining and Smelting Co.; F. A. Behling, manager of the Empire Copper Co., Mackay, Idaho; Senator I. E. Rockwell, of Bellevue, prominent operator of Wood River mines; Harry L.

Day, of the Hercules Mining Co.; Jerome J. Day, manager of Tamarack and Custer Mining Co.; Charles L. Bishop, manager of the Douglas mine of the Anaconda company. Robert N. Bell, inspector of mines, and F. A. Thomson, dean of the Idaho School of Mines, were also present.

VIRGINIA CITY, NEV.—Dec. 1

Nevada Silver Producers led by Governor Emmet D. Boyle, Whitman Symmes and S. H. Brady are on the way to Washington to confer with the Secretary of the Treasury McAdoo and Raymond T. Baker, director of the Mint. They will offer the protest against any effort to make a British-American corner or control of the price of silver. Committees from Arizona, Idaho, and Utah will also take part. The Nevada silver producers do not object to sharing the burdens of taxation imposed by the war, but they are opposed to scaling of prices which may mean practical confiscation of many of the silver mines in the West.

HOUGHTON, MICH.—Dec. 1

Production of Copper from Lake Superior mines for 1917 is estimated at 225,000,000 lb. providing there is no let-up in the present scale of operation. There is much speculation in the Lake Superior copper district as to the action of the Government relative to the price of copper following the conclusion of the agreement on a 23½c. basis which ends Jan. 1. That there can be a further reduction in the price seems out of the question, which would mean suspension of more mines or a cut in wages. Mines now are paying good bonuses to their employees and while no official announcement has been made there is every reason to believe they will continue to do so. Few of the mines are working full forces. All of them could use more men to advantage. Lake Superior mining men believe that stimulation to production might be secured by increasing the price to 25c. per lb., but they hardly expect any such action from the Government, notwithstanding the impending shortage.

HIBBING, MINN.—Nov. 30

Iron Ore Under Lake Syracuse is being negotiated for by F. D. Snyder, of St. Paul. The iron ore under this lake is owned by the State of Minnesota and is estimated at three million tons, which should bring to the state, one and a half million dollars in royalty. The offer to purchase the ore under Lake Syracuse is the first made under the new law providing machinery for the sale of such ore, the title to which is held to be in the state. The law fixes a minimum royalty of 50c. against the 25c. minimum that obtains in most of the iron-ore mine contracts that are now affecting the state.

Ore Production for season just closed for the Chisholm district will amount to almost 3,250,000 tons of iron ore. The Oliver Iron Mining Co. heads the list with a total tonnage of 1,750,000 tons. The Shenango Furnace Co. totals 1,003,000 tons and the M. A. Hanna Co. produced 466,000 tons. Shipments from the Hibbing district for the month of November will go down in Range history as the one that saved the 1917 ore-shipping season. Taking full advantage of the fine weather, the U. S. Steel Corporation and independent mines shipped to capacity in order to make up for the October setback due to the bad storms. The second Saturday in November was the biggest shipping day of the season when 52 ore trains left the Mitchell yards for the ore docks.

JOPLIN, MO.—Dec. 1

Sale of Property of the Fifteenth Street Mining Co. in the eastern part of Joplin to Oklahoma City investors for $100,000, has just been announced. The mine was developed by O. W. Sparks, of Galena, and associates, and was of especial interest both for its richness and for the further fact that it is located on one of the veteran mining tracts in this district. Some of the first big zinc mines in Missouri were developed on this ground 40 years ago. The mine has been operated for several months with a battery of nine hand jigs, and with this and a small amount of custom milling, from 70 to 80 tons of high-grade zinc concentrates have been made weekly. The product has been averaging between 63 and 64.90% metallic zinc, and is lead free. Operations are carried on at about 150 ft. H. C. Murphy, of Clinton, Okla., heads the purchasing company.

TORONTO—Dec. 1

Ownership of Tailings dumped on adjoining property was decided by Justice Middleton on Nov. 29, in the action brought by the Peterson Lake Mining Co. against the Dominion Reduction Co. The question involved was the ownership of a quantity of tailings deposited by the Dominion Reduction Co. and its predecessor, the Nova Scotia Mining Co. in Peterson Lake. The property of the Peterson Lake Co. includes the bed of the lake. The Nova Scotia became the owner of the land adjacent to the east arm of Peterson Lake, and in 1909 erected a reduction mill which went into operation in 1910. Tailings were at that time of no commercial value and were deposited in the lake. In 1912 the Nova Scotia company made an assignment and its assets became the property of the Dominion Reduction Co. In 1914 the manager of that company wrote to the Peterson Lake company, asking permission to continue the dumping of the tailings into the lake, which was granted. Subsequently, in May, 1915, the Dominion Reduction Co. requested permission to remove the tailings if they were of any value, and received a reply that "this would be satisfactory if the Peterson Lake company had the right to direct the point of deposit of the tailings." In June last, the present Peterson Lake directors secured an injunction to prevent the Dominion Reduction Co. from removing tailings from Peterson Lake territory. The Dominion Reduction Co. claimed the ownership of the tailings and the case was tried early in October. The judgment is to the effect that the Peterson Lake company is entitled to ownership of all tailings or slimes from the Dominion Reduction Co.'s mill, formerly the Nova Scotia mill, which were dumped upon Peterson Lake territory prior to July 2, 1915. As the dumping was in progress for five years previous to that date, and those of the earlier period were rich in silver content, it is estimated that the value of the slimes secured by the Peterson Lake may exceed one million dollars. In pronouncing judgment, Justice Middleton stated that the case was analagous to that of an owner of land, who in building a house secured permission to dump earth from the excavation upon the neighboring property, he would not afterwards be allowed to remove it. The judgment is regarded as a test one as several other Cobalt companies, including the Beaver, Temiskaming, McKinley, Darragh, Hudson Bay and Coniagas have also disposed of their tailings on adjacent properties. It is probable that the decision will be appealed.

The Mining News

ALABAMA

Jefferson County

WOODWARD IRON CO. (Woodward)—Stripping soft ore at Spaulding mine. Thomas Worthington, of Birmingham, has contract.

TENNESSEE COAL, IRON AND RAILROAD CO. (Birmingham)—One thousand carloads of piling and 5,000,000 ft. of platform lumber purchased for shipyard at Mobile. Work will begin when material arrives.

ALASKA

ALASKA GASTINEAU (Thane) — Ore milled in November amounted to 175,960 tons, assaying $1.08, and yielding 88.12c. per ton, comparing with 191,610 tons milled in October, assaying $1.07 per ton, and yielding 85.4c. per ton.

ARIZONA

Cochise County

DOS CABEZAS GOLD RIDGE MINING CORPORATION (Dos Cabezas)—Gold and silver ore found near surface; No. 1 air shaft cut 4-ft. vein at 125-ft. point; No. 1 tunnel cut vein with 4-in. streak of high-grade ore, also cut by No. 2 shaft at 300-ft. depth; No. 2 tunnel cut 12-ft. vein, carrying gold, silver and copper, the last 150 ft. being in low-grade ore. A. J. Welty, manager.

Mohave County

UNITED EASTERN (Oatman) — Shaft completed. Sump will be 80 ft. deep when finished.

UNION BASIN (Golconda)—Plans for new mill to replace one recently destroyed by fire nearly completed.

TOM REED (Oatman)—Recent discovery of ore in Gray Eagle claim is most important development since strike on Aztec claim a year ago. Discovery made at 400-ft. level of Gray Eagle shaft, believed to be faulted apex of Aztec-Big Jim vein. First crosscut shows vein to be 12 ft. wide.

Pima County

MILE WIDE (Tucson)—A 100-hp. engine and compressor to be installed at Copper King shaft. New shaft to be sunk on Margareta claim.

SAHUARITA (Tucson) — Old Sahuarita smeltery to be blown in again shortly. Recent developments in Twin district indicate sufficient tonnage. Glance, Pandora and Morgan mines are principal producers.

Pinal County

RAY CONSOLIDATED (Ray) — Produced in November, 7,600,000 lb. copper, comparing with 7,700,000 lb. in October.

TROY ARIZONA (Kelvin) — Climax shaft reached 475-ft. point. Station to be cut at 500-ft. level and crosscut started for orebody.

MAMMOTH (Casa Grande)—Macia & Williams operating, situated between the Lake Shore and Jack Rabbit and have found continuation of original orebody.

GILA DEVELOPMENT (Kelvin) — Larger pumping plant to be installed and shaft continued to 200-ft. level, where more development will be done. Over 300 ft. of development done to date on 100-ft. level.

Yavapai County

JEROME-PORTLAND (Jerome) — Sulphides reported on 500-ft. level. Annual meeting Dec. 3.

DUNDEE (Jerome)—Work delayed for few days by unusual flow of water. Arranged pumping facilities to prevent further delay. Shaft now at 520-ft. level. Sinking to continue to 950-ft. level. Shipments of three cars daily continue to Humboldt smeltery.

JEROME VERDE (Jerome)—Contract with United Verde Extension expires Dec 23, for hoisting through Edith shaft. Contract may be extended.

ARKANSAS

DIXIE QUEEN MINING CO. (Rush)—Working two prospects; one on Buffalo river, the other on Rush. Milling and free ore being taken now from both prospect tunnels.

BEAR HILL (Dodd City) — Just completed 5000-ft. water line, to supply mill. Mill ore shot down in drifts during installation of pipe line, will keep mill supplied for some weeks.

DEEP MINING CO. (Yellville) — Recently leased 4000 acres on Cowan Barrens between Yellville and Rush; making geological survey preparatory to deep drilling, in charge of Capt. Charles La Vasseur. Water of deep wells and springs being analyzed.

CALIFORNIA

Alpine County

CONSOLIDATED MINES CO. (Markleville)—Reported that William Sharp, engineer for company, closed negotiations for recently developed Curtz mine.

Amador County

CENTRAL EUREKA (Sutter Creek)—High-grade ore disclosed at points above 3350-ft. level. Large amount of ore in sight, ranging from $4 to $15 per ton. Shortage of labor necessitates hanging up 10 stamps of 40-stamp mill, but improvement in grade of ore compensates.

Butte County

FORBESTOWN DISTRICT again active. Gold Queen development continued at cost

of several thousand dollars and mine operated under lease for several months. Gold Bank is in good condition. J. A. Lewis, of Los Angeles, added to holdings immediately east of Gold Bank; mill is idle but developing. A. B. Hall of Los Angeles, who recently purchased claims from Fred Beik has done a large amount of development in last few months. Carlisle mine operated during season while water was sufficient for driving the stamp mill; developing. Southern Cross, owned by Mr. Rosenthal, of San Francisco, being developed. J. C. Gateman, of San Francisco purchased claims of Arthur Buckbee. Richard Grass Co., purchased by San Francisco men, being developed by tunnel and shaft. Florence group, near Southern Cross, reported sold to John Springmeyer, of Reno. Alfred Mullen developing property adjoining Shakespeare. Bootjack group, optioned by R. Schumann, of San Francisco, in litigation over payments. Antrim Consolidated has been connected with county road by 1½ mile cross road. Midas being developed by Fred Bachmann. Denver mine reported optioned by San Francisco men. New Burlington owned by W. C. Ralston expected to be in operation early next year.

Calaveras County

ANGELS CAMP DEEP MINING (Angels Camp)—Permitted to sell 6000 shares at 25c. on condition that 664,496 shares heretofore issued be restored to treasury and 314,000 shares outstanding, be deposited as escrow. Purchased Pat and Johnny unpatented claims and optioned Pioneer mine and Morse tract, the purchase price of which is $33,400, payable on Sept. 26, 1921. Warren Rose tract also optioned, the purchase price, $25,000, to be paid in monthly payments between April, 1918, and October, 1921. Sinking two-compartment shaft on Pioneer to 130 ft.; will deepen main shaft to 500 ft. and develop by crosscuts. Company is a Nevada corporation and previously issued all of its 1,000,000 shares in exchange for two claims and options on the others.

El Dorado County

BREALA COPPER (Placerville) — Ore assaying 4½% copper, $2.53 gold and $1.11 silver developed in mineral zone 18 ft. wide between walls. Developed 40 years ago by 100-ft. shaft, and recently unwatered by Victor E. Bonnefoy. Arranging for hauling ore to Breala station, a mile east, for rail shipment.

CINCINNATI (Placerville)—Situated in Kelsey district. Installing 60-ton quartz mill, 5-ft. diameter, of arrastre type, but similar in action to Chilean mill but provided with balls. Will require 7 hp. oil engine for driving. Ore is soft crumbly quartz in large porphyry dyke, developed by 250-ft. tunnel and by crosscuts and raises. Ore is low grade and friable.

Kern County

YELLOW ASTER (Randsburg)—Erecting crushing and screening plant to replace all hand sorting and thus reduce operating costs per ton.

BUTTE LODE LEASING CO. (Randsburg)—Recent report in "Journal" that Butte mine was being operated under management of John M. Taylor, and good ore opened, was incorrect. No good ore found and none being extracted; Mr. Taylor severed all connection with company several months ago, having sold all his interests. John M. McClintock, of Altadena, Calif., is present manager and company expects to treat ore on dumps, estimated at 30,000 tons, of less than $20 per ton, with 10-stamp mill now on property.

Nevada County

PITTSBURGH-GOLD FLAT (Grass Valley)—Permitted to sell 28,289 fractional shares at 10c. net; proceeds to be used for development work.

GRASS VALLEY CONSOLIDATED (Grass Valley)—Shaft unwatered to 900-ft. level; pumps installed for operation on levels above that depth in Allison Ranch mine. Permitted to sell 149,991 shares capital stock at $1, to provide substantial development fund. Includes Stanton, Mary Ann, Croesus, Minnesota, Keystone, Hill and Croesus Extension, and option on Benoit.

Plumas County

DELAWARE MILL (Frawley) — Overhauled and testing molybdenum ore from Joe Bryant mine.

HAZZARD (Seneca) — Reported International Smelting Co., of Utah, optioned property and preparing for extensive development. Same company operates Walker copper mines near Portola.

Sacramento County

NATOMAS (Natoma)—Dredge No. 2 being dismantled for reconstruction. Will have new wooden hull and be rebuilt after design of No. 1 and No. 4, for resoiling of land coincident with recovery of gold. No. 2 was one of the early boats built by Folsom Development Co., and operated on flat lands near Fairoaks. Was dismantled and reconstructed several years ago and large part of machinery still in good order and can be replaced on newly constructed dredge. The field near Fairoaks has been worked out and dredge, when ready for operation, will be installed near Nimbus in same neighborhood as No. 4 is digging.

Tuolumne County

CONFIDENCE (Sonora) — High-grade ore disclosed between 900- and 1000-ft. levels; vein 15 ft. wide carrying sulphurides. Mill under construction; building to be 120 x 25 ft.; 25 men working two shifts.

NONPAREIL GOLD SYNDICATE, LTD. (Sonora)—Suit by George S. Smith against Orris M. Sweet to recover $10,000 for himself and other creditors. Plaintiff agrees to undertake sale of property and settlement of accounts.

COLORADO

Gunnison County

ANACONDA (Iola)—Shipping copper ore.

VULCAN (Iola)—Operations resumed by new company.

AKRON (White Pine)—Shipments made via Sargents, on Denver & Rio Grande R.R. Auto-truck haulage used.

Hinsdale County

BLACK CROOK (Lake City)—Mine and mill operating.

HIGHLAND CHIEF (Lake City)—Operations at this lead mine in Henson Creek section resumed.

GOLDEN FLEECE (Lake City)—Mill alterations completed; now operating successfully.

La Plata County

MARY MURPHY (Durango) — Large shoot shipping-grade copper-silver ore reported opened between first and second levels. Sinking from second level to connect with tunnel level. Prospecting disclosed other shoots at different places. Owned by Cave Basin Mining Co.

Mineral County

MINERAL COUNTY (Creede)—Working Happy Thought; ore treated in Humphreys mill.

CREEDE EXPLORATION CO. (Creede)—Subsidiary of American Smelting and Refining Co., has lease on Amethyst below Wooster adit level and on portion of Commodore. Amethyst shaft being unwatered. Commodore shaft will be unwatered when machinery is installed. Power plant built at Humphreys mill.

Montrose County

RADIUM ORE SAMPLING CO. (Montrose)—New organization incorporated by O. B. Willmarth, C. J. Moynahan, and R. E. Diemer, to build and operate sampling plant in Montrose. Building will be three stories high, equipped for sampling and testing carnotite ores. O. B. Willmarth, manager.

San Juan County

COMING WONDER (Silverton)—Development in last year; opened orebodies now being mined. Tramway built to loading station near railroad to allow operation throughout winter.

RED MOUNTAIN MINES (Silverton)—Organized as subsidiary to Mary Murphy Mines Co. to take over and operate Genesee-Vanderbilt, Yankee Girl, and other properties opened by Joker tunnel at Red Mountain. Equipment has been overhauled; motor-driven air compressor being installed at Genesee mine. About 40 men engaged on development which will be continued during winter. George E. Collins, manager; W. C. Prosser, of Silverton, superintendent.

San Miguel County

ALTA MINES (Telluride)—Situated in Gold King Basin; taken over by Tonopah-Belmont interests; development and mill reconstruction under way. John M. Fox, local manager.

SCHLESINGER RADIUM CO. (Naturita)—Recently purchased 22 carnotite claims from Crucible Steel Co. Development in progress under management of Charles L. Harrington. Karl L. Kithil, of Denver, vice president and general manager.

Summit County

BROOKS SNIDER (Breckenridge)—Working through mill-level adit.

MOLLIE (Breckenridge)—Shipments of gold, silver and lead ore being made from this Yuba Dam Flat mine.

BIG RESERVE MINING CO. (Breckenridge)—Remodeling mill; expect to be operating soon. Flotation to be installed. Frank Peabody, manager.

EVANS DREDGE (Breckenridge) — Equipping with machinery; expect to have dredge in operation in November. Yuba Construction Co., of California, building dredge.

TONOPAH PLACERS CO. (Breckenridge)—Constant prospecting with churn drill being done ahead of dredge No. 1 in Blue River valley. Believed blanket vein of Iron Mask mine may be found in this area.

Teller County

BIG TOAD (Cripple Creek)—Alterations to Reid mill nearly completed; electric machinery will be installed. Expected to be treating low-grade ore from Dante mine by Nov. 15.

VINDICATOR (Independence) — Net earnings, for third quarter, $49,000, being less than past quarters due to high cost of supplies, and smaller production because of labor shortage. Drifting on La Bella vein cut in crosscut from 20th level of Golden Cycle shaft. Surface tramway built to transport milling-grade ore.

IDAHO

Shoshone County

IDAHO-NEVADA (Wallace)—At 200-ft. depth in drift from shaft, considerable lead with copper showing. Being developed by local company through two-mill assessments levied every 60 days.

CHICAGO-BOSTON (Wallace)—Day interests abandoned option taken about a year ago, being refused more time. Shaft sunk 200 ft. and vein explored on 100- and 200-ft. levels, showing shoot 400 ft. long in lower one. Wanted time to sink 200 ft. further. Another company is ready to take option if sufficient stock is pooled.

INTERSTATE-CALLAHAN (Wallace)—Announced quarterly dividend of 50c. per share, payable Jan. 2. Earnings amounted to $1 a share for third quarter, but dividend passed to provide surplus to meet war tax. New flotation plant in operation will add 300 tons to milling capacity. Tailings dump, estimated at 200,000 tons, will be reground and treated by flotation.

MICHIGAN

Copper

SOUTH LAKE (Houghton) — Shipped 6000 tons of ore in October.

LAKE (Point Mills)—Shipments for October were 7300 tons.

ALLOUEZ (Allouez)—Shows slight increase this month; 2100 tons daily is shipment record at present.

WOLVERINE (Kearsage)—Handling 37 cars of ore daily, compared with 32 last month.

WHITE PINE (Ontonagon)—Production for 1917 will be over 4,000,000 lb., about equal to output last year.

WYANDOT (Houghton) — Accumulated stockpile wil be sent to Winona stamp mill.

FRANKLIN (Demmon)—Has made improvements at mill, including longer trestle, holding 16 cars.

AHMEEK (Ahmeek) — Production for 1917 estimated, will amount to over 30,000,000 lb., comparing with 24,000,000 lb. last year. Rock averages better than 22 lb. per ton. Shipping about 4600 tons daily.

HANCOCK (Hancock) — Production for November estimated at 340,000 lb., comparing with equal amount for September. Could use increased force of one third underground. No indication of any immediate betterment in labor situation.

CALUMET & HECLA (Calumet)—Shipping daily average of 9500 tons of ore; 21 stamp heads in use. Ahmeek shipments are handled at mill with eight stamp heads now exclusively used for this rock. Calumet & Hecla mills handling large amount of conglomerate, as shipments include Tamarack as well as regular conglomerate from old mine; stamps average 500 tons daily on latter class of rock, being harder than any other ore from these mines.

MINNESOTA

Mesabi Range

MAJORCA (Calumet)—Pickands Mather Co. constructing two eating and sleeping camps to accommodate employees engaged in constructing washing plant and sinking shaft.

DRAPER IRON ORE CO. (Coleraine)—Another new mine to be opened in Itasca County. Test pitting and drilling on NW¼, Sect. 10-56-23; plan to start operations at once.

ASH IRON CO. (Duluth)—Certificate of incorporation filed. Walter B. Congdon, James Wanless, and Charles A. Humbert, of Duluth; David T. Adams, of Chicago, and Kay Todd, of St. Paul, incorporators. Capitalized at $500,000.

MISSOURI

Joplin District

CRESCENT (Quapaw, Okla.) — Constructing new 300-ton mill on lease in Oklahoma, south of Baxter, Kan.

LEAD BOY (Quapaw, Okla.)—Has new 200-ton mill almost completed on Hickel lease of Quapaw land, south of Baxter, Kan. To be in operation by Dec. 15.

MIOKA (Miami, Okla.)—Incorporated for $50,000. Started drilling on three 40-acre leases, one north of Picher, one south of Baxter, and one at Lincolnville. George C. Brown, president.

LUCKY STRIKE (Miami, Okla.)—Sinking two shafts; building mill on lease southeast of Quapaw. Has two of richest drill strikes in history of district. Mill to be ready for operation Jan. 1. R. L. Austin, Miami, president.

KELTNER (Joplin)—Purchased 500-ton Milton mill and will erect on lease adjoining Picher-Bingham tract at Picher, Okla. Mill was built in sheet-ground field at Carterville in 1916 at cost of $82,000 and sold for $35,000. Keltner company will make improvements. One shaft on lease into ore and two others will be started at once. F. W. Evans, Joplin, president.

GREENING MINING AND MILLING (Oklahoma City, Okla.) — Construction started on new 300-ton mill on lease southeast of Douthat, Okla. Ore found at 120 ft. Company is subsidiary of Hare Mining and Milling Co., which has in operation new mill west of Picher, Okla. Alfred Hare, Oklahoma City, president and general manager of both companies.

MONTANA

Lewis and Clark County

SCRATCH GRAVEL GOLD (Helena)—Shipping to smeltery.

ECONOMY (Helena)—Stoping gold-bearing ore at 300-ft. level; building mill.

MARYSVILLE GOLD SYNDICATE (Marysville)—Thirty tons a day to St. Louis mill from Blue Bird-Hickey tunnel.

HELENA MINING BUREAU (Helena)—Producing 100 tons silver-lead ore per week from Helena mine.

NEW YORK ENGINEERING AND TESTING PLANT (Helena)—Concentrating 100 tons a day of manganese ore for shipment East.

Silver Bow County

ANACONDA (Butte)—Bell and Diamond mines, shut down since recent strike, resumed operations Nov. 26 with 600 men for the day and night shift. On Nov. 28, two shifts started in Berkley mine, bringing production to nearly 92% of normal. Leonard was down for few days following discovery of gas on Nov. 22, that broke into 1300-ft. level through bulkheads used to confine the mine fires. Gas spread through stopes in upper levels. The places in danger were bulkheaded again and mine put in shape for safe resumption of work. Twenty-two of the 28 mines of company had no accidents during September.

NEVADA

Nye County

TONOPAH ORE PRODUCTION for week ended Nov. 24 was 10,125 tons, valued at $177,187, comparing with 10,093 tons, the previous week. Producers were: Tonopah Belmont, 2372 tons; Tonopah Mining, 2750 tons; Tonopah Extension, 2380 tons; Jim Butler, 750 tons; West End, 1211 tons; MacNamara, 507 tons; Rescue, 66 tons; Cash Boy, 50 tons.

WHITE CAPS EXTENSION (Manhattan)—Making preparations for cutting station on 400-ft. point in shaft and putting in 20-ft. sump. Bunk house for 16 men completed.

MANHATTAN CONSOLIDATED MINES DEVELOPMENT (Manhattan)—Recently opened some high-grade ore in Consolidated workings; east orebody from fourth level developed for 53 ft., showing considerable high-grade ore.

White Pine County

RED HILLS SILVER MINE bonded by Tex Hall and a Mr. Russell; developing.

A. B. WITCHER AND D. McDONALD working new lead in Snake River, just north of Sacramento Pass, preparing to discontinue.

TUNGSTONIA MINES (Tungstonia)—Producing a little ore; only company mining tungsten ore, as price is too low.

NEVADA CONSOLIDATED (McGill)—Production for November amounted to 6,900,000 lb. copper, as compared with 7,000,000 lb. in October.

NEW MEXICO

CHINO (Santa Rita)—Produced 6,313,272 lb. copper in November, comparing with 6,333,000 lb. in October.

OREGON

MANGANESE PROPERTY near Wimer, recently owned by Earl M. Young, of Rogue River, sold to Seattle steel men, who will develop. Ore occurs in several veins running through serpentine.

QUEEN OF BRONZE (Takilma)—This copper mine shipping high-grade ore; 60 men employed. John Hampshire, manager.

WASHINGTON

O. K. (Metaline Falls)—Expects to cut main vein in lower tunnel during winter.

OLD MORNING AND MAMMOTH (Metaline Falls)—Have sold all machinery and equipment.

LEAD AND ZINC CO. (Metaline Falls)—Filed petition in bankruptcy. Olaus Jeldness of Spokane, named as receiver.

UTAH

Beaver County

CEDAR-TALISMAN (Milford)—Six shipments silver-lead ore during November.

MOSCOW (Milford)—Temporarily closed down with 150 tons of ore on hand, owing to low price of lead.

CREOLE COPPER (Milford)—Mining some copper ore. Property 25 miles west of old Horn Silver.

BEAVER COMBINATION (Milford) — Stated to have broken into adjoining Moscow property several hundred feet beyond lines. Question of boundary line may be brought to court for settlement. Also possible consolidation suggested.

Juab County

TINTIC SHIPMENTS for week ended Nov. 23 amounted to 230 cars, as compared with 219 the week preceding, more cars being available. In lifting embargo, stated that some smelters are considering limiting mines to certain fixed tonnages, to avoid future embargoes. Reported that in the case of Eagle & Blue Bell, which during September shipped only five cars, a daily limit of three cars will be set, although mine is able to ship much more.

TINTIC STANDARD (Eureka)—Important strike made on 1300-ft. level, 30 ft. from new working shaft; new orebody opened for four sets in width and six sets in length. About 300 tons shipped and 70 mine cars ready for shipment. Ore is shipping grade carrying silver, gold, copper and lead. Similar ore on 1170-ft. level.

Salt Lake County

SILVER SHIELD (Bingham)—Car of lead-silver ore carrying gold and copper shipped by lessees from upper workings. Shaft down 200 ft. and bottom in mineralized ground.

VICTOR (Salt Lake)—Drifting toward so-called Cardiff limestone contact; has been following 6-ft. vein for 50 ft., showing altered limestone with some lead ore. Expects to reach Victor fissures shortly.

EMMA CONSOLIDATED (Alta)—Sullivan 1340-cu.ft. compressor installed. Diamond drill to be set up in Emma Copper crosscut near fissure cut last year, showing shipping ore carrying silver, lead and copper.

WASATCH MINES (Alta)—Owns 900 acres, including former producers, namely, Columbus, Flagstaff, etc. Driving drainage and operating tunnel, at present 1350 ft. underground with objective point 2000 ft. ahead, to get under old Columbus stopes. Progress nine to 10 ft. daily.

Summit County

THREE KINGS (Park City) — Shaft down 570 ft. passing through black limestone. Objective is contact of limestone with Ontario quartzite; making 4 to 5 ft. daily.

SILVER KING CONSOLIDATED (Park City)—Shipments reduced from 50 to 40 tons daily, owing to embargoes. Carload of concentrates also from mill weekly. Spiro tunnel to open Thaynes Canon section in about 4600 ft. averaging about 10 ft. daily; at present slower, owing to loose ground and necessary timbering. Considerable flow of water.

Tooele County

DEEP CREEK SHIPMENTS showing increase. Western Utah Copper again shipping chiefly copper ore with some lead. Shipments begun from Western Utah Extension; Woodman Mining continues to send out ore. Big Chief mine at Ferber, 12 miles west of Gold Hill station, shipping about 36 tons daily of lead-silver ore, hauling to Gold Hill.

WOODMAN MINING (Gold Mill)—Shipping from Frankie property.

TOOELE-GOLD HILL MINING (Gold Hill)—Strike of copper ore reported on Goldstone claim, but extent not determined. D. L. Dunyon, manager.

WESTERN UTAH COPPER (Gold Hill)—Has been shipping 200 to 250 tons daily; limiting output lately to about 150 tons a day, owing to inability of smelteries to take larger tonnage.

CANADA

Ontario

GOLD DISCOVERY made in Lightning River in Northern Ontario, south of Lake Abitibi. Only one discovery reported to date consisting of a 3-ft. vein.

ONTARIO-KIRKLAND (Kirkland Lake) Mining plant will be installed.

BURNSIDE (Kirkland Lake) — Purchased by Aladdin-Cobalt and arrangements made for development.

BEAVER (Cobalt)—Completed balance of payments on Kirkland Lake gold mines, which it is operating.

NEWRAY (Porcupine)—Under option to Crown Reserve; reported to be developing favorably. Stated that 30-ft. vein has been cut.

KERR LAKE (Cobalt)—Transferred all assets to Kerr Lake Mines, Limited, of Ontario, and shareholders will receive one share of the new stock for each share of old.

MONDEAU CLAIMS (McElroy Township)—Road completed to this property, under option to Kerr Lake. Sinking by hand will start shortly; plant to be installed as soon as possible.

PROVINCIAL (Cobalt) — New milling equipment comprising Hardinge mill, two slime tables, classifier and slime tank with a Grotch oil-flotation machine installed, with capacity of 40 tons per day. Ore on dumps, and much high-grade ore blocked out.

DOME (Porcupine) — Announced mill will be shut down because of shortage of labor and high operating costs. Stated that $6 ore on limited production will only pay operating expenses. Mine operation will continue and development at greater depths undertaken.

Quebec

GRAPHITE MINES have shipped 376,390 lb., valued at $75,776, during 1917, comparing with a value of $2461 the previous year. Shortage of labor curtailed output during present year.

MEXICO

METAL EXPORT TAXES are provided in a decree of Mexican Government, according to dispatches from Mexico City, dated Dec. 1, as follows: Gold, 93.33 pesos per kilogram; silver, 2.803 pesos per kilogram; ore concentrates, 3.924 pesos per kilogram; copper bars, 0.51 centavos per kilogram: ore concentrates, 0.621 centavos per kilogram; lead bars, 0.56 centavos per kilogram; ore concentrates, 0.75 centavos per kilogram; zinc bars, 0.73 centavos per kilogram; ore concentrates, 0.97 centavos per kilogram; tin bars, 9.12 centavos per kilogram; ore concentrates, 10.9 centavos per kilogram; mercury, 18 centavos. Export duty on mercury, it is stated, will be based on flasks on an average net weight of 34 kg., and a sample will be taken from every tenth flask for assay to determine whether it contains an amalgam of any other precious metal subject to a higher duty.

SANTA GERTRUDIS (Pachuca)—Report for year ended June 30, 1917, states profit amounts to $8738. A total of 8856 ft. was driven, raised and sunk in various levels. Development interfered with owing to frequent cessation of milling caused by shortage of supplies. Mining costs advanced on account of increased costs of labor and supplies. It was reported that reserves on June 30, 1917, are estimated at 1,125,000 dry tons containing 68,783 oz. gold and 13,756,756 oz. silver. Recoverable amount estimated at 61,904 oz. gold and 12,381,080 oz. silver. Milling operations were 53.2% of normal capacity due to shortage of cyanide, but full supply now arranged for. Milling costs increased owing to low tonnage and cost of labor and supplies. Treated 213,872 dry tons of ore, averaging $8.96 per ton. Recovery in bullion was 89.84%.

AFRICA

TRANSVAAL GOLD PRODUCTION, as reported by Transvaal Chamber of Mines for October, was 751,290 oz.; being 13,059 oz. more than in September, but 41,049 oz. less than in October, 1916. For the 10 months ended Oct. 31, the total value was $159,968,214 in 1916, and $155,636,039 in 1917; a decrease of $4,332,175, or 2.7%, this year. The number of negro laborers employed in October was 186,792, of whom 4620 were in the diamond mines, 11,841 in the coal mines and 170,331 in the gold mines. This shows a decrease from September of 1003 in the gold mines and of 934 in the total number. There was a decrease of 28,999 negroes as compared with October of last year.

The Market Report

SILVER AND STERLING EXCHANGE

Nov. Dec.	Sterling Exchange	Silver New York, Cents	Silver London, Pence	Dec.	Sterling Exchange	Silver New York, Cents	Silver London, Pence
29	4.7515	...	42⅜	3	4.7515	85⅛	42⅜
30	4.7515	84½	42⅜	4	4.7515	85⅛	42⅜
1	4.7515	84½	42⅜	5	4.7515	85⅛	42⅜

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

DAILY PRICES OF METALS IN NEW YORK

Nov. Dec.	Copper Electrolytic	Tin Spot.	Lead N. Y.	Lead St. L.	Zinc St. L.
29	....	...	....	.....	.....
			6½	6.25	7⅜
30	*23½	†88	@6½	@6.30	@7⅜
			6½	6.25	7.65
1	*23½	†88	@6½	@6.35	@7.70
			6¼	6.30	7.50
3	*23½	†88	@6½	@6.35	@7.60
			6¼	6.30	
4	*23½	†88	@6½	@6.40	7½
			6¼	6.30	
5	*23½	†88	@6½	@6.40	7½

† Nominal.

* Price fixed by agreement between American copper producers and the U. S. Government, according to official statement for publication on Friday, September 21, 1917.

The above quotations (except as to copper, the price for which has been fixed by agreement between American copper producers and the U. S. Government, wherein there is no free market) are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to bajis of New York, cash, except where St. Louis is the normal basing point.

The quotations for electrolytic copper are for cakes, ingots and wirebars.

We quote electrolytic cathodes at 0.05 to 0.10c. below the price of wirebars, cakes and ingots.

Quotations for spelter are for ordinary Prime Western brands. We quote New York price at 17.5c. per 100 lb. above St. Louis.

Some current freight rates on metals per 100 lb. are: St. Louis-New York 17c.; St. Louis-Chicago, 6.3c.; St. Louis-Pittsburgh, 13.1 cents.

LONDON

Nov. Dec.	Copper Standard Spot	Copper Standard 3 Mos.	Copper Electrolytic	Tin Spot	Tin 3 Mos.	Lead Spot	Zinc Spot
29	110	110	125	290	285½	30½	54
30	110	110	125	291	289½	30½	54
1	....	....	....	....	....	....	....
3	110	110	125	293½	291	30½	54
4	110	110	125	294	292	30½	54
5	110	110	125	295	292½	30½	54

The above table gives the closing quotations on London Metal Exchange. All prices are in pounds sterling per ton of 2,240 lb. For convenience in comparison of London prices, in pounds sterling per 2,240 lb., with American prices in cents per pound the following approximate ratios are given, reckoning exchange at $4.7515. £30½ = 6.4696c.; £54 = 11.4545c.; £120 = 25.4544c.; £137 = 29.0605c.; £240 = 50.9089c. Variations, £1 = 0.2121205c.

Metal Markets

NEW YORK—Dec. 5, 1917

All of the metal markets were dull again, insofar as events appear and may be reported. Lead was a shade stronger, but zinc was distinctly weaker.

Copper—The business in copper is now so thoroughly organized that production passes toward consumption without a ripple. The refinery production in November was larger than in October, but was very far short of the rate of a year ago. A little business was done this week with domestic consumers in contracts for delivery in February and March, 1918. This business was done at 23½c., cash, New York, without any guarantee whatever.

Copper Sheets are quoted at 33c. per lb., f.o.b. mill, for hot rolled, and 1c. higher for cold rolled. Copper wire is quoted at 28c., f.o.b. mill.

Tin—This market is quoted entirely nominally, supplies having been attached by the U. S. Government, whose survey of everything in warehouses is minute. There is probably a little business done surreptitiously in lots that have escaped attention. Anyway, there are rumors of such, but the quantities involved cannot be large. We quote Straits tin nominally at 88c., for there is no doubt that that price would be paid, or that 85½c. would be paid for Banka tin.

Lead—The volume of business was larger than in the previous week, but this was due to a few transactions in large lots, one of 1000 tons being reported. The ordinary inquiry was less than in the previous week, and therefore the market appeared to be duller. However, it was very firm and in the St. Louis market prices advanced a little on small transactions.

Zinc—On Friday some business was done at 7⅜c. and later at 7½c., the aggregate amounting to a considerable tonnage, but on the following day some round lots were sold at concessions and thereafter the market became distinctly weak. In the aggregate the business of the week amounted to a fairly large tonnage.

Zinc Sheets—Price of zinc sheets has not been changed. Market is still at $19 per 100 lb. f.o.b. Peru, less 8% discount.

Other Metals

Aluminum—This market continues dull with small transactions taking place at 36@38c. per lb. for No. 1 ingots at New York.

Antimony—This market was distinctly stronger. We quote spot at 15½c. Consumers came into the market. It is supposed that they were covering Government orders. None of the importing houses would quote futures. They are holding off for higher prices, expecting to get 18 or 20c.

Bismuth—Unchanged at $3.50 per pound.

Cadmium—This metal is quoted at $1.50 @1.75 per pound.

Nickel—Steady at 50c. per lb., premium of 5c. per lb. for electrolytic.

Quicksilver—Stocks in this market have been greatly reduced and prices are much stronger. We quote $115. San Francisco reports, by telegraph, $110, steady.

Gold, Silver and Platinum

Gold—In the nine months ended Sept. 30, the exports of gold from the United States to Japan were $155,467,726, against $9,300,630 in the corresponding period last year. Exports to Spain were $39,337,400, and to Mexico $6,712,279 for the nine months.

Silver—This market has remained steady at 42⅜d. in London, without any special feature. The conferences between the United States and the Allied Governments in reference to taking over the silver output of America in order to stabilize the price have not yet resulted in any definite conclusion, but negotiations are still pending.

Our correspondent in Washington wired on Dec. 5 that conferences with Western silver producers were still in progress and that a delegation from Salt Lake City was en route.

Complaints came from Japan of a scarcity of silver coins. The one-yen pieces (50c. in face value) have almost disappeared and subsidiary silver coins are in very short supply. The embarrassment is so great that it is proposed to issue notes of 50 sen (one-half yen) to relieve it. At present the smallest paper issue is the one-yen note.

Mexican dollars at New York: Nov. 30, 64½c.; Dec. 1, 64½c.; 3, 65⅛c.; 4, 65⅜c.; 5, 65⅜c.

Platinum—Active at $103@105.

Palladium—Stronger. We quote $125@130.

Zinc and Lead Ore Markets

Joplin, Mo., Dec. 1—Blende, per ton, high, $72.65; basis 60% Zn, premium $72.50; medium to low, $65@62.50; calamine, per ton, 40% Zn, $35@38; average value, all grades of zinc, $57.89 per ton.

Lead, high, $85.75; basis 80% Pb, $75@85; average selling price, all grades of lead, $81.05 per ton.

Shipments the week: Blende 7049 tons, calamine 436 tons, lead 1730 tons. Value, all ores the week, $573,510.

One producer-smelter today characterized the local ore situation and the metal situation as intolerable. His company is having a hand-to-mouth existence because of the inability to get ore to the smeltery. Shippers can get but a part of the cars needed, and the transportation companies are endeavoring to divide them around to the best advantage, yet every buyer is "kicking" strenuously. Purchased ore aggregates hundreds of tons with no cars to move the ore. Gondolas, or coal flat cars, are being resorted to.

Platteville, Wis., Dec. 1—Blende, basis 60% Zn, $62 base for premium grade down to $57 base for second grade. Lead ore, basis, 80% Pb, $65 per ton. Shipments reported for the week are 3090 tons of zinc ore, 60 tons of lead ore, and 691 tons of sulphur ore. For the year to date the figures are: 134,819 tons of zinc ore, 6647 tons of lead ore, and 26,431 tons of sulphur ore. Shipped during the week to separating plants, 4057 tons of zinc ore.

Other Ores

Manganese Ore—Metallurgical ore continues firm at $1.20 per unit.

Molybdenum Ore—In good demand with sales reported at $2.20@2.25 per lb. of molybdenum sulphide, basis 90%.

Pyrites—Spanish lump quoted at 15c. per unit, on basis of 10s. ocean freight, buyer to pay excess freight and war risk, except that concession of 2% of war risk is allowed. Ocean rates remain at 35s. for Northern, 40s. for Southern and 42s. 6d. for Gulf ports.

Tungsten Ore—We quote this market unchanged as to prices, which range from $26 per unit for the highest grade of ore down to about $20 for ore of 60% grade.

With respect to this market, Charles Hardy, under date of Dec. 4, reports the following:

"A proclamation issued on Nov. 28, makes most of the imports subject to license and tungsten is one of those articles, especially mentioned in the proclamation. It is anticipated that the necessary delays in obtaining licenses and the nationality of several shippers of tungsten ore in South America will delay shipments and generally interfere with the regulation of imports. This fear of shortage of imports caused considerable business to be done for spot goods during the last few days. A new development, however, has since taken place and buyers are for the time being, very reluctant to buy material. The railroads have almost invariably placed an embargo on shipments leaving New York and buyers do not feel that they can afford to buy material which cannot be shipped to them, thus the week begins with a dead look and prices in tungsten are absolutely nominal."

Exports of nickel and chrome ores from New Caledonia for the five months ended May 31 are reported by the *Bulletin du Commerce* of Noumea at 20,963 metric tons of nickel ore and 17,542 tons of chrome ore. Exports of metals were 3799 tons of nickel matte.

The iron ore movement from the Lake Superior region in November was very heavy, the total shipments having been 7,331,804 tons, or 1,616,357 tons more than in November, 1916. This will bring the total for the season up to within 2,500,000 tons of those of last season. In 1916 shipments ended with November, but this year an effort is being made to bring down several more cargoes.

PITTSBURGH—Dec. 4

The traffic situation dominates the entire iron and steel trade in the Pittsburgh and adjacent districts. Through the continued shortage in Connellsville coke the blast furnaces have had operations still further curtailed, while coal supplies to steel mills, particularly in the Youngstown district are insufficient, though perhaps a trifle better than two or three weeks ago. The coke shortage is attributed entirely to car shortage, and it is claimed that through the two wage advances recently made and the termination of much outdoor work, there could now be a much larger production of coke if the cars were available. The pooling of the roads east of Chicago, arranged by the War Industries Board, Nov. 24, was promptly followed by the issuance of a number of drastic orders by the General Operating Committee, the seven railroad vice-presidents who have in charge the conduct of the pool, these orders being directed chiefly toward relieving the congestion in the Pittsburgh district. No definite results, in freer traffic movement, are to be noted thus far. The Carnegie Steel Co. was operating 48 of its 59 blast furnaces at the beginning of last week, dropping to 44 on Friday, and to 41 at the beginning of this week. Merchant-furnace operations have been intermittent, there being frequent bankings. There was a partial cleanup over Sunday of coke stalled en route and receipts at some furnaces are improved this week.

Only a small volume of commercial steel business is being done in the open market. The large steel producers are as a rule out of the market. They are continually receiving large orders for Government account, while they still have fairly heavy shipments against old contracts, and their production is restricted. The leading interest has between 40,000 and 50,000 tons of finished rolled steel in yards awaiting cars for loading. Demand is light, consumers being uncertain what their requirements will be, and as shipments will depend more and more upon priority orders they see no particular advantage in getting mills to accept orders at this time. Cases of mills offering to sell steel at above the set prices are rare and never occur in connection with the large mills. Specifications against steel contracts are at a rate far below shipments, and make a favorable comparison only with the small volume of specifications received in October. The sheet market, however, is quite active, as it has been since the Government prices were announced Nov. 5. It is estimated that sales of sheets by the independent mills in November totaled about 140,000 tons, of which perhaps one-fourth was directly or indirectly for the Government All sales of sheets were at the set prices.

Pig Iron—The large steel interests, normally self-contained as to pig iron, have run still shorter, on account of their decreased production, and several hundred thousand tons of steel-making iron, chiefly basic, could be sold to near-by steel works if it were available. As the merchant furnaces have likewise had their output restricted by coke shortage there are no offerings. Of foundry grades there are occasionally small sales. We quote the market largely nominal at the set prices: Bessemer, $36.30; basic and No. 2 foundry, $33; malleable, $33.50; gray forge, $32, f.o.b. furnaces, the freight from the valleys to Pittsburgh being 95c. Messrs. W. P. Snyder & Co. report their computations of average prices obtained in market sales of valley iron in November at $36.30 for bessemer and $33 for basic, these being the set prices, and the same as obtained in October. While the tonnage entering into the October computations was about 100,000 tons, the tonnage for November was extremely light.

Steel—There are practically no market offerings of billets or sheet bars, and buyers without an established mill connection are having a hard time. The mills are taking fairly good care of regular customers, at the set prices, $47.50 for billets and $51 for sheet bars, f.o.b. mill, Pittsburgh or Youngstown.

Ferroalloys

Ferromanganese—The market is quiet. The usual asking price for prompt or forward is $250, delivered, but this price is frequently shaded by $1 to $3 a ton.

Coke

Connellsville—Production continues on a restricted scale on account of car shortage, being at the rate of about 70% of the average rate in 1916, against an average of 80 to 85% during the fore part of this year. The byproduct ovens, however, are now operating substantially at capacity, being benefited by recent priority orders in favor of their coal.

STOCK QUOTATIONS

N. Y. EXCH.†	Dec. 4
Alaska Gold M	2⅜
Alaska Juneau	2⅜
Am.Sm.& Ref.,com.	72⅜
Am. Sm. & Ref., pf.	100
Am. Sm. Sec., pf., A	92
Am. Sm. Sec., pf. B	‡96
Am. Zinc	12⅛
Am. Zinc, pf	42⅛
Anaconda	55⅛
Batopilas Min	1
Bethlehem Steel	75
Bethlehem Steel, pf.	80
Butte & Superior	16⅜
Cerro de Pasco	30⅛
Chile Cop	14⅜
Chino	41
Colo.Fuel & Iron	33
Crucible Steel	52⅛
Dome Mines	6⅝
Federal M. & S.	11
Federal M. & S., pf.	30⅜
Great Nor., ore ctf.	26
Greene Cananea	38
Gulf States Steel	84⅛
Homestake	90
Inspiration Con	43
International Nickel	27
Kennecott	31
Lackawanna Steel	79⅛
Miami Copper	28
Nat'l Lead, com.	43⅛
National Lead, pf.	99⅛
Nev. Consol	17
Ontario Min	4
Quicksilver	.75
Quicksilver, pf.	.50
Ray Con	21⅞
Republic I.&S.,com.	74⅛
Republic I. & S., pf.	94¾
Sloss-Sheffield	35
Tennessee C. & C.	12⅜
U. S. Steel, com	87⅜
U. S. Steel, pf	107⅛
Utah Copper	74⅝
Va. Iron C. & C	50

N. Y. CURB†	Dec. 4
Big Ledge	1⅜
Butte & N. Y	.75
Butte C. & Z	7
Butte Detroit	.25
Caledonia	.42
Calumet & Jerome	1⅜
Can. Cop. Corpn	1 1/16
Carlisle	3
Cashboy	.04
Con. Ariz. Sm.	1 3/16
Con. Coppermines	7⅛
Con. Nev.-Utah	⅛
Emma Con	⅛
First Nat. Cop	2⅜
Goldfield Con	.43
Goldfield Merger	.04
Greenmonster	1/16
Hecla Min	4 1/16
Howe Sound	4
Jerome Verde	.75
Kerr Lake	4⅜
Louisiana	.50
Magma	.45
Majestic	.40
McKinley-Dar-Sa	.60
Milford	1⅜
Mohican	1/16
Mother Lode	.29
N. Y. & Hond	11
Nipissing Mines	8⅛
Nixon Nevada	1 1/16
Ohio Cop	.93⅞
Ray Hercules	3
Richmond	‡.56
Rochester Mines	.38
St. Joseph Lead	16⅛
Standard S. L	1/16
Stewart	.28⅛
Success	13
Tonopah	.5
Tonopah Ex	1⅜
Tribullion	⅛
Troy Arizona	.16
United Cop	.50
United Verde Ext	32
United Zinc	1⅛
Utica Mines	.08
Yukon Gold	1⅞

SAN FRAN*	Dec. 4
Alta	.03
Andes	.10
Best & Belcher	.02
Bullion	.01
Caledonia	.08
Challenge Con	.05
Confidence	.10
Con. Virginia	.16
Gould & Curry	.01
Hale & Norcross	.02
Jacket-Cr. Pt	.03
Mexican	.08
Occidental	.60
Ophir	.09
Overman	.04
Savage	.02
Sierra Nevada	.13
Union Con	.12½
Utah Con	.01
Belmont	3.50
Jim Butler	.70
MacNamara	.16
Midway	.06
Mont.-Tonopah	.08
North Star	.04
Rescue Eula	.09
West End Con	.62
Atlanta	‡.09
Booth	.04
Comb. Frac	‡.03
D'field Daisy	‡.02
Florence	.11
Jumbo Extension	.13
Kewanas	.05
Nevada Hills	.05
Nevada Packard	.15
Round Mountain	.20
Silver Pick	.07
White Caps	.75
Big Jim	‡.75
United Eastern	3.65

BOSTON EXCH.*	Dec. 4
Adventure	1
Ahmeek	80
Algomah	.25
Allouez	50
Ariz. Com., ctfs.	10⅛
Arnold	‡.25
Bonanza	.21
Butte-Balaklava	.56
Calumet & Ariz.	63
Calumet & Hecla	425
Centennial	14
Copper Range	42⅛
Daly West	2
Davis-Daly	4⅛
East Butte	10⅛
Franklin	4⅛
Granby	65
Hancock	8⅛
Hedley	‡15⅛
Helvetia	.25
Indiana	1
Isle Royale	23
Keweenaw	1
Lake	6
La Salle	2⅛
Mason Valley	5
Mass	6⅛
Mayflower	1⅛
Michigan	1⅛
Mohawk	57
New Arcadian	1⅞
New Idria	13⅛
North Butte	13
North Lake	.50
Ojibway	‡1⅛
Old Dominion	38
Osceola	56⅛
Quincy	63
St. Mary's M. L.	54
Santa Fe	.50
Seneca	6⅛
Shannon	5⅛
Shattuck-Ariz	18
So. Lake	1⅛
So. Utah	.14
Superior	5
Superior & Bost	3⅛
Trinity	7 3/16
Tuolumne	1 7/16
U. S. Smelting	44⅞
U. S. Smelt'g, pf.	44
Utah Apex	2⅛
Utah Con	12⅛
Utah Metal	2⅜
Victoria	3
Winona	1
Wolverine	32
Wyandot	.50

BOSTON CURB*	Dec. 4
Alaska Mines Corp	.25
Bingham Mines	9⅛
Boston Ely	.75
Boston & Mont	.51
Butte & Lon'n Dev	.14
Calaveras	1⅛
Calumet-Corbin	‡.01
Chief Con	1⅛
Cortez	.10
Crown Reserve	.20
Crystal Cop	.55
Eagle & Blue Bell	2
Gila Copper	17⅛
Houghton Copper	.60
Intermountain	.80
Iron Cap, Com	.14
Iron Cap Cop., pf.	‡14⅛
Mexican Metals	.25
Mines of America	1⅛
Mojave Tungsten	.28
Nat. Zinc & Lead	.30
Nevada-Douglas	1⅛
New Baltic	.75
New Cornelia	14¾
Oneco	.25
Pacific Mines	‡.35
Rex Cons	.13

SALT LAKE*	Dec. 3
Bannack	.26
Big Four	‡.01
Cardiff	2.50
Colorado Mining	.10
Daly	1.40
Daly-Judge	7.00
Empire Copper	1.17
Gold Chain	.14
Grand Central	.50
Iron Blossom	.59
Lower Mammoth	.03
May Day	.03
Moscow	.11
Prince Con	.65
Rico Wellington	.18
Silver-King Coal'n	2.70
Silver King Con	3.50
Sioux Con	‡.03
So. Hecla	.85
Tintic Standard	1.45
Uncle Sam	.02
Wilbert	.15
Yankee	.02

TORONTO*	Dec. 3
Adanac	.13
Bailey	.95
Beaver Con	.30
Chambers Ferland	.07
Coniagas	2.90
Hargraves	.08
La Rose	.35
Peterson Lake	.12
Temiskaming	.25
Wettlaufer-Lor	.05
Davidson	.30
Dome Exten	.09
Dome Lake	.13
Hollinger	4.95
McIntyre	1.31
Newray	.31
Porcu. Crown	.22
Teck-Hughes	.25
Vipond	.20
West Dome	.13

STOCK QUOTATIONS—Continued

COLO. SPRINGS	Dec. 4
Cresson Con	4.87½
Doctor Jack Pot	.03½
Elkton Con	.03½
El Paso	.16
Gold Sovereign	.02½
Golden Cycle	1.64
Granite	.40
Isabella	.07½
Mary McKinney	.06½
Portland	1.10
United Gold M	.18½
Vindicator	.33

LONDON	Nov. 16
Alaska Tre'dwell	‡£1 0s 0d
Burma Corp	4 0 0
Cam & Motor	0 11 6
Camp Bird	0 8 0
El Oro	0 9 0
Esperanza	0 8 3
Mexican Mines	5 15 0
Min. Corp. Can.	0 16 6
Nechi, pfd	0 10 0
Oroville	0 19 3
Santa Gert'dis.	0 14 3
Tomboy	1 1 6

* Bid prices. † Closing prices. ‡ Last Quotations.

MONTHLY AVERAGE PRICES OF METALS

Silver	New York			London		
	1915	1916	1917	1915	1916	1917
Jan.	48.855	56.775	75.630	22.731	26.960	36.682
Feb.	48.477	56.755	77.585	22.753	26.975	37.742
Mar.	50.241	57.935	73.861	23.708	27.597	36.410
April	50.250	64.415	73.875	23.709	30.662	36.963
May	49.915	74.269	74.745	23.570	35.427	37.940
June	49.034	65.024	76.971	23.267	31.060	39.065
July	47.519	62.940	79.010	22.597	30.000	40.110
Aug.	47.163	66.083	85.407	22.780	31.498	43.418
Sept.	48.680	68.515	100.740	23.591	32.584	50.920
Oct.	49.385	67.855	87.332	23.925	32.361	44.324
Nov.	51.714	71.604	85.891	25.094	34.192	43.584
Dec.	54.971	75.765		26.373	36.410	
Year	49.684	65.661		23.675	31.315	

New York quotations cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

Copper	New York		London			
	Electrolytic		Standard		Electrolytic	
	1916	1917	1916	1917	1916	1917
Jan.	24.008	28.673	88.083	131.921	116.167	142.895
Feb.	26.440	31.750	102.667	137.895	133.167	148.100
Mar.	26.310	31.481	107.714	136.750	136.000	151.000
April	27.895	27.935	124.319	133.842	137.389	147.158
May	28.625	28.788	135.457	130.000	152.522	142.000
June	26.601	29.962	112.432	130.000	137.455	142.000
July	23.865	26.620	95.119	128.409	125.500	140.409
Aug.	26.120	25.380	110.283	122.391	126.304	137.000
Sept.	26.855	25.073	113.905	117.500	134.071	135.250
Oct.	27.193	23.500	122.750	110.000	142.523	125.000
Nov.	30.625	23.500	134.659	110.000	155.432	125.000
Dec.	31.890		145.316		162.842	
Year	27.202		116.059		138.281	

Tin	New York		London	
	1916	1917	1916	1917
January	41.825	44.175	175.548	185.813
February	42.717	51.430	181.107	198.974
March	50.741	54.388	193.609	207.443
April	51.230	55.910	199.736	220.171
May	49.125	63.173	196.511	245.114
June	42.231	62.053	179.466	242.083
July	38.510	62.570	168.357	242.181
August	38.565	62.681	169.870	243.978
September	38.830	61.542	171.345	244.038
October	41.241	61.851	179.307	247.467
November	44.109	74.740	186.932	274.943
December	42.635		183.368	
Av. year	43.480		182.096	

Lead	New York		St. Louis		London	
	1916	1917	1916	1917	1916	1917
January	5.921	7.626	5.826	7.530	31.167	30.500
February	6.246	8.636	6.164	8.595	31.988	30.500
March	7.136	9.199	7.375	9.120	34.440	30.500
April	7.630	9.288	7.655	9.158	34.368	30.500
May	7.463	10.207	7.332	10.202	32.967	30.500
June	6.936	11.171	6.749	11.123	31.011	30.500
July	6.352	10.710	6.185	10.644	28.137	30.500
August	6.244	10.594	6.088	10.518	29.734	30.500
September	6.810	8.680	6.699	8.611	30.786	30.500
October	7.000	6.710	6.898	6.650	30.716	30.500
November	7.042	6.249	6.945	6.187	30.500	30.500
December	7.513		7.405		30.500	
Year	6.853		6.777		31.359	

Spelter	New York		St. Louis		London	
	1916	1917	1916	1917	1916	1917
Jan.	16.915	9.619	16.745	9.449	89.810	48.329
Feb.	18.420	10.045	18.260	9.875	97.762	47.000
Mar.	16.846	10.300	16.676	10.130	94.048	47.000
April	16.695	9.459	16.525	9.289	99.056	54.632
May	14.276	9.362	14.106	9.192	94.217	54.000
June	11.752	9.371	11.582	9.201	68.591	54.000
July	8.925	8.643	8.755	8.473	50.750	54.000
Aug.	8.730	8.360	8.560	8.190	51.587	54.000
Sept.	8.990	8.136	8.820	7.966	52.095	54.000
Oct.	9.829	7.983	9.659	7.813	54.159	54.000
Nov.	11.592	7.847	11.422	7.672	56.023	54.000
Dec.	10.665		10.495		55.842	
Year	12.804		12.634		72.071	

New York and St. Louis quotations, cents per pound. London, pounds sterling per long ton.

Pig Iron, Pgh.	Bessemer‡		Basic‡		No. 2 Foundry	
	1916	1917	1916	1917	1916	1917
January	$21.60	$35.95	$18.78	$30.95	$19.70	$30.95
February	21.16	36.37	18.93	30.95	19.51	30.95
March	21.81	37.37	19.20	33.49	19.45	35.91
April	21.65	42.23	18.95	38.90	19.45	40.06
May	21.78	46.94	19.11	42.84	19.58	45.60
June	21.95	54.22	18.95	50.05	19.34	50.14
July	21.95	57.45	18.95	53.80	19.20	53.95
August	21.95	54.17	18.95	50.37	19.22	53.95
September	22.88	46.40	19.58	42.24	19.53	48.58
October	24.61	37.25	21.26	33.95	21.51	33.95
November	30.07	37.25	28.18	33.95	26.55	33.95
December	35.16		30.95		30.79	
Year	$23.88		$20.98		$21.15	

‡ As reported by W. P. Snyder & Co.

Current Prices—Materials and Supplies

IRON AND STEEL

SHEETS—Quotations are in cents per pound in various cities from warehouse, also the base quotations from mill:

Blue Annealed	Large Lots, Pittsburgh	St. Louis	Chicago	San Francisco	New York Dec. 6, 1917	New York One Yr. Ago
No. 10	4.25	5.42	5.45	8.25	5.445	4.25
No. 12	4.30	5.47	5.50	8.30	5.495	4.30
No. 14	4.35	5.52	5.55	8.35	5.545	4.35
Black						
Nos. 18 and 20	4.80	6.32	6.25	8.30	6.245	3.80
Nos. 22 and 24	4.85	6.37	6.30	8.35	6.295	3.85
No. 26	4.90	6.42	6.35	8.40	6.435	3.90
No. 28	5.00	6.52	6.45	8.50	6.445	4.00
Galvanized						
No. 10	5.25	6.97	6.80	....	6.695	....
No. 12	5.35	6.97	6.80	8.60	6.795	4.50
No. 14	5.35	6.97	6.80	8.60	6.795	4.50
Nos. 18 and 20	5.65	7.17	7.10	8.90	7.095	4.90
Nos. 22 and 24	5.80	7.32	7.25	9.05	7.245	5.30
No. 26	5.95	7.47	7.40	9.20	7.395	5.45
No. 28	6.25	7.77	7.70	9.50	7.695	5.75

STEEL RAILS—The following quotations are per 100 lb. f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Dec. 6. 1917	Pittsburgh One Year Ago	Chicago* Dec. 6. 1917	Chicago* One Year Ago
Standard bessemer rails	$38.00	$33.00	$38.00	$38.00
Standard openhearth rails	40.00	40.00	40.00	40.00
Light rails, 8 to 10 lb.	43.50	50.00	43.50	47.00
Light rails, 12 to 14 lb.	39.00	49.00	39.00	46.00
Light rails, 25 to 45 lb.	30.00	47.00	30.00	44.00

Note—Reported that rerolled rails are higher than new rails rolled from billets.

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Dec. 6. 1917	Pittsburgh One Year Ago	Chicago	St. Louis	San Francisco
Standard railroad spikes, ⅝- in. and larger	$5.00 to 5.50	$2.65	$5.00	$6.45 base	$7.25
Track bolts, square nuts	7.00 to 8.50	3.25	6.25	Premium	8.80
Standard section angle bars	3.50 to 4.00	2.00	4.50	Premium	4.65

STRUCTURAL MATERIAL—The following are the base prices f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Pittsburgh	New York Dec. 6. 1917	New York 1 Yr. Ago	St. Louis	Chicago	San Francisco	Dallas
Beams, 3 to 15 in.	$3.00	$4.195	$3.85	$4.27	$4.20	$7.75	$6.00
Channels, 3 to 15 in.	3.00	4.195	3.25	4.27	4.20	7.75	6.00
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20	7.75	6.00
Tees, 3 in. and larger	3.00	4.195	3.40	4.27	4.25	7.75	6.00
Plates	3.25	4.445	4.00	4.52	4.45	7.75	9.00

RIVETS—The following quotations are per 100 lb.:

STRUCTURAL

	Mill. Pittsburgh	Warehouse New York Dec. 6. 1917	Warehouse New York One Year Ago	Warehouse Chicago	Warehouse St. Louis	Warehouse San Francisco	Warehouse Dallas
¾ in. and larger	$5.25	$7.00	$5.25	$5.50	$5.55	$7.15	$8.40
CONE HEAD BOILER							
¾ in. and larger	5.35	7.10	5.35	5.60	5.65	7.25	8.50
⅝ and ⅞	5.50	7.25	5.50	5.75	5.80	7.40	8.65
½ and ⅝	5.85	7.60	5.85	6.10	6.15	7.75	9.00

Lengths shorter than 1 in. take an extra of 50c. Lengths between 1 in. and 2 in. take an extra of 25c.

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill. Pittsburgh	Chicago	St. Louis	Denver	Birmingham
Straight	$4.75	$6.00	$5.50	$7.50	$6.75
Assorted	4.90	6.00–6.50	5.75	7.75	7.00

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Dec. 6. 1917	One Month Ago	One Year Ago
$4.00 to $5.00	$4.00 to $5.00	$2.60 to $2.70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York	St. Louis	Chicago	San Francisco
Galvanized	10—2½ %	10—2½ %	10—2½ %	+40 %
Bright	20—2½ %	20—2½ %	20—2½ %	15 %

SWEDISH (NORWAY) IRON—This material per 100 lb. sells as follows:

	Dec. 6. 1917	One Year Ago
New York	$14.00	$6.00
Cleveland	15.00	6.30
Chicago	13.50	5.50

In coils an advance of 50c. usually is charged:
Note—Stock scarce generally.

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Chicago	Birmingham	St. Louis	Denver
$0.12	$0.09	$0.16	$0.15	$0.14

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Chicago
Solid	12c.	14½c.	9c.
Hollow	24c.	23½c.	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh, basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
⅜, ¼ and ⅝	44 %	17 %	¾ to 1½	33 %	17 %
½	48 %	33½ %			
¾ to 3	51 %	37½ %			

LAP WELD

2	44 %	31½ %	2	26 %	12 %
2½ to 6	47 %	34½ %	2½ to 4	28 %	15 %
			4½ to 6	28 %	15 %

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅜, ¼ and ⅜	40 %	22½ %	¾ to 1½	33 %	18 %
½	45 %	32½ %			
¾ to 1½	49 %	36½ %			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42 %	30½ %	2	27 %	14 %
2½ to 4	45 %	33½ %	2¼ to 4	29 %	17 %
4½ to 6	44 %	32½ %	4½ to 6	28 %	16 %

Note—National Tube Co. quotes on basing card dated Apr. 1.

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
¾ to 3 in. butt welded	38 %	42.8 %	40.1 %
3½ to 6 in. lap welded	18 %	38.8 %	36.1 %

	Galvanized New York	Galvanized Chicago	Galvanized St. Louis
¾ to 3 in. butt welded	22 %	27.8 %	25.1 %
3½ to 6 in. butt welded	List	18.8 %	22.1 %

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5 %.

MISCELLANEOUS

FLOTATION OILS—Prices of oils for flotation, in cents per gallon, in barrels:

	New York	Chicago	Denver In Bbl. Lots	Denver In Carload Lots
Pure steam-distilled pine oil	$0.50½	$0.45	$0.30	$0.27
Pure destructively distilled pine oil	.40	.43	.30	....
Pine tar oil	.28½	.30	.24½	.19
Crude turpentine	.37	.47	.44	.38
Hardwood creosote	.19½ *	.....	.34½	.31

*F.o.b. Cadillac, Mich.

SODIUM CYANIDE—New York price is 37c. per lb.; Denver, 44c.; in Chicago, 50c.

SODIUM SULPHIDE—In New York the price per pound is 4c. to 4¼c. for concentrated, 2¼c. to 2½c. for crystals. The Denver price for concentrated is quoted at 3½c. The Chicago price is 3½c. Concentrated comes in 500-lb. drums, the crystals in 400-lb. barrels.

ZINC DUST—New York price is 18c. per lb. in 1600-lb. barrel; Chicago, 18c.; in Denver, 18c.

ALUMINUM DUST—Chicago price is $1 per lb.

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points east of Mississippi River (except in Alabama, Georgia and Florida) is $97.50 for Cameo, $102.50 for Union miners' carbide. In territory between Mississippi River and the Rockies and in Alabama, Georgia and Florida, add $5; west of Rockies, add $10 to $15.

LINOLEUM—In 50-sq.yd. rolls in carload lots the price is 88c. per square yard, for concentrating tables.

HOSE—

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40 %

Air

	First Grade	Second Grade	Third Grade
¾-in., per ft.	$0.60	$0.35	$0.30

Steam—Discounts from list

First grade.... 30 % Second grade.... 30 % Third grade.... 40 %

RUBBER BELTING—The following discounts from list apply o transmission rubber and duck belting:

Competition 50 % Best grade 20 %
Standard 35 %

LEATHER BELTING—Present discounts from list in the following cities are as follows for cut lengths:

	Medium Grade	Heavy Grade
New York	40 %	35 %
St. Louis	45 %	40 %
Chicago	30+10 %	40+5 %
Birmingham	35 %	40 %
Denver	40 %	40 %

RAWHIDE LACING—40%.

MANILA ROPE—For rope smaller than ¾-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¾-in., 8 ft.; ⅞-in., 6; 1-in., 4½; 1-in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¾-in. and larger, in 1200-ft. coils:

Boston	$0.35	New Orleans	$0.33
New York	.35	Los Angeles	.34
Chicago	.37½	Seattle	.33½
St. Paul	.34	Denver	.35½

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.77
Asbestos for high-pressure steam	1.54
Duck and rubber for piston packing	.88
Flax, regular	.66
Flax, waterproofed	.99
Compressed asbestos sheet	.99
Wire insertion asbestos sheet	1.21
Rubber sheet	.55
Rubber sheet, wire insertion	.88
Rubber sheet, duck insertion	.44
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

FIRE BRICK—Quotations on the different kinds in the cities named are as follows, f.o.b. works:

	New York	Chicago
Silica brick, per 1000	$50.00 to 55.00	$55.00 to 60.00
Fire clay brick, per 1000, No. 1	45.00 to 55.00	.....
Magnesite brick, per net ton	135.00 to 145.00	.....
Chrome brick, per net ton	135.00	.....
Deadburned magnesite brick, per net ton	85.00 to 90.00	.....
Special furnace chrome brick, per net ton	60.00 to 70.00	60.00 to 80.00

Standard size fire brick, 9 x 4½ x 2½ in. The second quality is $4 to $5 cheaper per 1000.

St. Louis—High grade, $55 to $65; St. Louis grade, $40 to $50.

Birmingham—Fire clay, $25 to $30; Denver, $23, per 1000.

RAILWAY TIES—For fair-size orders, the following prices per tie hold:

	Material	7 in. x 9 in. by 8 Ft. 6 In.	6 in. x 8 in. by 8 Ft.
New York	Yellow Pine	$1.30	$1.06 to 1.11
St. Louis	White Oak	1.00	.75
Chicago	Plain	.97	.82
Chicago	Creosoted	1.30	1.15
San Francisco	Green	1.13	.80
San Francisco	Creosoted	2.02	1.43

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Chicago	St. Louis	Birmingham	Denver
Cup	5¼	5.6	10½	10½
Fiber or sponge	6	5.9	15	15
Transmission	6	5.9	13	13
Axle	4	3.3	4	4
Gear	4½	6	5½	5½
Car journal	3½	3.75	5	5

COTTON WASTE—The following prices are in cents per pound:

	New York			
	Dec. 6, 1917	One Year Ago	Cleveland	Chicago
White	11.00 to 13.00	10.00 to 12.00	16.00	14.00 to 15.00
Colored mixed	8.50 to 12.00	7.00 to 9.00	14.00	10.00 to 12.00

WIPING CLOTHS—In Cleveland the jobbers' price per 1000 is as follows:

13¼ x 13¼ ..... $35.00 13¼ x 20½ $45.00

In Chicago they sell at $30 to $33 per 1000.

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Dec. 6, 1917	One Year Ago	Dec. 6, 1917	One Year Ago	Dec. 6, 1917	One Year Ago
Raw in barrels	$1.22	$1.01	$1.25	$1.05	$1.22	$0.96
5-gal. cans	1.32	1.11	1.40	1.15	1.32	1.06

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White			
	Dec. 6, 1917		1 Year Ago		Dec. 6, 1917		1 Yr. Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry	and In Oil	Dry
100-lb. keg	12.25	12.50	10.50	11.00	12.00		10.50	
25- and 50-lb. kegs	12.50	12.75	10.75	11.25	12.25		10.75	
12½-lb. keg	12.75	13.00	11.00	11.50	12.50		11.00	
1- to 5-lb. cans	14.25	14.50	12.50	12.50	14.50		12.50	

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York		Cleveland		Chicago	
	Dec. 6, 1917	One Year Ago	Dec. 6, 1917	One Year Ago	Dec. 6, 1917	One Year Ago
Hot pressed square	$1.00	$0.50	$1.40	$3.00	$2.00	$3.00
Hot pressed hexagon	1.00	.50	1.20	3.00	2.00	3.00
Cold punched square	1.00	.....	.75	2.00	1.50	2.50
Cold punched hexagon	1.00	.50	.75	2.75	1.50	3.00

Semifinished nuts sell at the following discounts from list price:

	Dec. 6, 1917	One Year Ago
New York	40%	40%
Cleveland	50—10%	65—10%
Chicago	50%	65—10%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
¾ by 4 in. and smaller	30%	50%	40—10%
Larger and longer up to 1 in. by 30 in.	15%	40%	30—5%

WROUGHT WASHERS—From warehouses at the places named the following amount is deducted from list price:

New York ..... $1.00 Cleveland ..... $3.50 Chicago $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York ..... $5.00 Cleveland ..... $5.50 Chicago $3.50

EXPLOSIVES—Price per pound in small lots at cities named:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	$0.27½	$0.34½	.....	$2.50*
Boston	.....	.....	.36¼	$0.43¾	....
New Orleans	.....	.27½	.34½	.....	....
Los Angeles	$0.24	.30	.39	.....	....
Seattle	.18½	.24¾	.31¾	.41¾	....
Chicago	.19¾	.23¾	.33	.43	2.45*
St. Paul	.20	.26¼	.33¼	.....	2.55*
St. Louis	.16½	.20½	.29½	.39½	2.15*
Denver	.19	.25¼	.32¼	.42¼	....
Dallas	.25	.29	.39	.49	....

*Keg.

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Mexican heavy, 12-14 Baumé	7c.	none
Domestic light, 22-26 Baumé	5⅝c.	7½c.

Note—There is practically no fuel oil in Chicago at present time.

OIL—Price per 50-gal. bbl. is as follows:

City	Fuel	Black	Red Engine	Steam Cylinder	Gasoline
Seattle	$1.60	$6.25	$11.00	$21.00	$10.25
Denver	3.00	8.75	18.00	24.00	12.00
Boston	6.00	11.00	16.00	23.00	12.50
San Francisco	4.05	5.75	9.50	20.50	10.00
New Orleans	3.00	7.50	15.50	18.00	11.25
Cincinnati	5.04	6.00	12.50	18.00	12.00

Note—Standard prices of oil are necessarily difficult to give. Those above are for average grades.

CONSTRUCTION MATERIALS

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.)	$61.00	$62.00
Tar pitch (in 400-lb. bbl.)	15.00	16.50
Asphalt pitch (in barrels)	29.00	30.50
Asphalt felt	60.00	62.00

PREPARED ROOFINGS—Standard grade rubbered surface complete with nails and cement costs per square as follows in New York and Chicago:

	1-Ply		2-Ply		3-Ply	
	c.l.	l.c.l.	c.l.	l.c.l.	c.l.	l.c.l.
No. 1 grade	$1.15	$1.40	$1.45	$1.60	$1.75	$1.90
No. 2 grade	1.10	1.25	1.25	1.40	1.50	1.65

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.85 per roll in carload lots and $2.10 for smaller quantities.

Shingles, red and green slate finish, cost $4.75 per square in carloads, $5 in smaller quantities, in Philadelphia.

HOLLOW TILE—

	4x12x12	8x12x12	12x12x12
Boston	$0.08	$0.15	$0.20
St. Paul	.055	.138	.153
Denver	.11	.20	.30
Los Angeles	.0668	.12	.20
Seattle	.06	.10	.16

LUMBER—Price per M in carload lots:

	8 x 8-in. x 20 Ft. and Under			12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston	.....	.....	.....	$40.00	.....	.....
Seattle	$23.00	$23.00	$23.00	23.00	$23.00	$23.00
Los Angeles	.....	30.00	30.00	.....	.....	.....
New Orleans	26.00	.....	.....	.....	38.00	.....
St. Paul	....	38.00	38.00	38.00	....	51.00
Denver	....	32.00	.....	28.50	....	34.00
San Francisco	....	24.00	24.00	....	....	24.00

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Seattle	$23.00	$23.00	$23.00	$23.00	$23.00
New Orleans	26.00	.....	.....	24.00	.....
San Francisco	....	24.00	24.00	....	24.00
St. Paul	....	53.00	34.00	61.00	37.50
Denver	....	30.00	30.00	....	30.00

PORTLAND CEMENT—These prices are for barrels in carload lots, including bags:

	Dec. 6, 1917	One Month Ago	One Year Ago
New York	$2.22	$2.22	$1.72
Jersey City	2.16	2.16	1.60
Boston	2.27	2.27	1.92
Chicago	2.21	2.31	1.86
Pittsburgh	2.31	2.31	1.81
Cleveland	2.44	2.44	1.94
Denver	3.10	3.20	...
Los Angeles	2.40	2.40	...

LIME—Warehouse prices:

	Hydrated per Ton		Lump per 300-Lb. Barrel	
	Finished	Common	Finished	Common
New York	$16.50	$13.25	$2.10	$1.90
Chicago	15.00	12.00	1.90	....
St. Louis	13.00	10.75	....	....
Dallas	20.00	15.00	....	....
San Francisco	16.50	....	....	1.65